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WIRELESS INSTITUTE OF AUSTRALIA

THE WIA RADIO AMATEUR'S JOURNAL

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AMATEUR RADIO

THE WIA RADIO AMATEUR'S JOURNAL

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CONTENTS

Technical

A Piece of Wire 20
Robert McGregor VK3XZ
FETs as RF Amplifiers 19
Mike Murphy VK6KRO
Getting Started with Amateur Radio Satellites (4) 13
Bill Magnusson VK3JT
Mobile Radio Compatibility Problems in Motor Vehicles (2) 15
Phil Clark VK1PC
Random Radiators 8
Ron Fisher VK3OM and Ron Cook VK3AFW
The Horizontal Loop 22
Joe Ellis VK4AGL
Tool Sharpening 11
Vic Joyce VK2EVJ
220 Volt Devices 21
Bill Toussaint VK6LT

General

JOTA – First Healesville Scout Group 25
Derek Thurgood VK3DD
Television in 1932 23
Lloyd Butler VK5BR
Amateur Radio in Hungary Today 24
Stephan Pall VK2PS

Operating

Awards 31
Contests
Calendar 32
Sunshine State Jack Files Memorial Contest Rules 32

Columns

Advertisers' Index 56
ALARA 42
AMSAT 39
Club Corner 47
Divisional Notes
VK2 Notes, 5/8 Waves 45
Editor's Comment 2
Education Notes 44
FTAC News 43
Hamads 54
HF Predictions 52
How's DX? 33
Intruder Watch 42
Knutshell Knowledge 43
Morseword No 50 49
Over to You - Members Opinions 49
Pounding Brass 38
QSL Bureaux Listing 56
QSLs from the WIA Collection 46
Silent Keys – Obituaries 48
Spotlight on SWLing 41
Stolen Equipment 22
VHF/UHF An Expanding World 36
WIA Directory 2,3
WIA News 3

Cover

A self portrait of Vic Joyce VK2EVJ. Whatever form our interest in amateur radio takes, we all have the need to sharpen tools from time to time. Vic tells us how in his article 'Tool Sharpening' on p 11.

EDITOR'S COMMENT

BILL RICE VK3ABP EXECUTIVE EDITOR

Exponential Expansion

No, this is not going to be a lesson in mathematics! History, perhaps. And yet, as we will see, there is a connection between the two areas of understanding. This word "exponential" is one we encounter frequently in electronic circuit theory; but how does it apply to history?

Essentially, an exponential process is one in which the rate of increase (or decrease) of some quantity depends at any time on what happened to it just before, and that in turn, just before that, and so on. In other words, each generation builds on the work of its predecessors. Population growth is one excellent example, whether of bacteria in a culture or people on a planet.

One field in which this rule applies is the growth of communications. Beginning at the time when speech had first evolved, the human race has always had a need to communicate over more than shouting distance. A few thousand years ago, a fast runner with a message stick was the latest technology. This evolved into a messenger with a written scroll, riding a camel or a horse. Wheels came into being, and sails to cross the water; but only a few hundred years ago it still took many months to send a message to the other side of the world, and just as long for a reply to come back!

After a few side-tracks with signal flags, semaphores and heliographs, along came electric telegraphy and submarine cables. This made it possible for a chosen few to span the globe in a matter of minutes. Only 40 years more before Hertz and Marconi showed the way to radio; which really began with amateur radio! The telephone system began to evolve, and when allied with HF radio it became possible for private citizens to talk around the world.

At this stage (the 1930s), someone enunciated an aim for communication engineers to work for: That it should be possible for any person on earth to talk at will to any other as chosen, and if no reply was received, to know the other person had died! In some ways, with some limitations (the ionosphere for one), we radio amateurs as a group have been closer to achieving this aim than most others, until the marriage of the telephone system with geosynchronous satellites. In the meantime, the world's telephone population expanded (exponentially?), manual exchanges disappeared, customers dialled their wanted numbers, first locally, then nationally, then internationally. Computers managed the process, from path selection to preparing the bill! Finally achieving the engineer's aim now depends not on engineering, but on bringing the rest of the world up to the economic level of the more privileged nations. And that may well be a far more difficult process!

Where do we go from here? TV telephones, optical fibres already replacing wires; mobile phones already appearing in cars and aircraft, for the use of the general public. Phone answering machines and faxes are proliferating (exponentially?). The engineering problems are all soluble; and we radio amateurs can take some pride in having helped to solve them. What are we like at economics?

Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

Wireless Institute of Australia

The world's first and oldest National Radio Society - Founded 1910

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WIA NEWS

FROM THE WIA EXECUTIVE OFFICE

HF Contest Championship

The WIA HF Contest Championship, which is awarded each year, is calculated from the scores obtained in the four major WIA sponsored contests, the John Moyle Memorial Field Day Contest, the Remembrance Day Contest, the VK Novice Contest, and the VK/ZL/Oceania Contest. Eligible candidates for this prestigious award must be WIA members, and must have submitted scores for a minimum of three of the four contests.

The 1990 HF Contest Championship winners have now been announced by the Federal Contest Co-ordinator, Neil Penfold VK6NE.

The Phone section has been won by Phil Rayner VK1PJ, with an outstanding performance as top scorer in each HF contest he entered. The CW section resulted in a tie between Russ Coleston VK4XA, and Jeff Jeffrey VK6AJ.

All three winners will receive inscribed wall plaques as permanent records of their achievements.

Amateur Satellite Usage

There is no doubt that, through amateur satellite activities, important contributions have been made by a number of amateur radio societies.

However, IARU Region 3 has expressed concern that some of the projects making use of amateur satellites are not entirely appropriate to the use of amateur bands.

In accordance with the definition of the amateur satellite service provided for in the ITU Regulations, an amateur satellite should be such:

1. that its purpose or mission should be for self-training, intercommunication and technical investigation; and

2. that its service should be carried out by radio amateurs, that is, by duly authorised persons interested in radio techniques solely with a personal aim and without pecuniary interest.

Member IARU societies are asked to monitor national satellite activities to ensure that sponsoring bodies are aware of and act within the guidelines.

WARC 92

The IARU calendar for March 1991 notes that WARC 92 is now less than a year away, and lists June 1991 as the deadline for administrations to submit proposals to the ITU for circulation.

IARU representatives have attended WARC-related CCIR meetings recently held in Duesseldorf, Melbourne, Geneva, Helsinki and again in Geneva. David Wardlaw VK3ADW, the leader of the WIA WARC 92 team, has just returned from Geneva where

WIA DIVISIONS

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually their residential State or Territory, and each Division looks after amateur radio affairs within their State.

Division	Address	Officers			Weekly News Broadcasts	1991 Fees
VK1	ACT Division GPO Box 600 Canberra ACT 2601 Phone (06) 247 7006	President Secretary Treasurer	Ted Pearce Jan Burrell Ken Ray	VK1AOP VK1BR VK1KEN	3.570 MHz 2m ch 6950 70cm ch 8525 2000 hrs Sun	(F) $67.50 (G) (S) $54.00 (X) $40.50
VK2	NSW Division 109 Wigram St Parramatta NSW (PO Box 1066 Parramatta) 2124 Phone (02) 689 2417 Fax (02) 633 1525	President Secretary Treasurer (Office hours	Roger Henley Tim Mills David Horsfall Mon-Fri 1100 - 1400 Wed 1900 - 2100)	VK2ZIG VK2ZTM VK2KFU	(R Denotes repeater) Times 1045 and 1915 on Sunday 1.845 MHz AM, 3.595 AM(1045) SSB (1915 only), 7.146 AM (1045 only) 10.125 SSB (1045 only), 28.320 SSB, 52 120 SSB 52.525 FM 144.12 (SSB), 147.000 FM(R) 438.525 FM(R) 584.750 (ATV Sound) 1281.75FM (R) Relays also conducted via many repeaters throughout NSW.	(F) $65.00 (G) (S) $52.00 (X) $38.00
VK3	Victorian Division 38 Taylor St Ashburton Vic 3147 Phone (03) 885 9261	President Secretary Treasurer Office hours	Jim Linton Barry Wilton Rob Hailey 0900-1600 Tue & Thur	VK3PC VK3XV VK3XLZ	1.840 MHz AM, 3.615 SSB, 7.085 SSB, 147.250 FM(R) Mt Macedon, 147.225 FM(R) Mt Baw Baw 146.800 FM(R) Mildura, 438.075 FM(R) Mt St Leonard 1030 hrs on Sunday	(F) $69.00 (G) (S) $55.00 (X) $42.00
VK4	Queensland Division GPO Box 638 Brisbane Qld 4001 Phone (07) 284 9075	President Secretary Treasurer	Murray Kelly Eddie Fisher Eric Fittock	VK4AOK VK4ABX VK4NEF	1.825, 3.605, 7.118, 10.135, 14.342, 18.132, 21.175, 24.970, 28.400, MHz 52.525 regional 2m repeaters and 1296.100 0900 hrs Sunday Repeated on 3.605 & 147.150 MHz, 1930 Monday	(F) $67.50 (G) (S) $54.00 (X) $40.50
VK5	South Australian Division 34 West Thebarton Rd Thebarton SA 5031 (GPO Box 1234 Adelaide SA 5001) Phone (08) 352 3428	President Secretary Treasurer	Rowland Bruce John McKellar Bill Wardrop	VK5OU VK5BJM VK5AWM	1820 kHz 3.550 MHz, 7.095, 14.175, 28.470, 53.100, 145.000, 147.000 FM(R) Adelaide, 146.700 FM(R) Mid North, 146.900 FM(R) South East, ATV Ch 34 579.00 Adelaide, ATV 444.250 Mid North Barossa Valley 146.825, 438.425 (NT)3.555, 146.500, 0900 hrs Sunday	(F) $67.50 (G) (S) $54.00 (X) $40.50
VK6	West Australian Division PO Box 10 West Perth WA 6005 Phone (09) 388 3888	President Secretary Treasurer	Alyn Maschette John Farnan Bruce Hedland - Thomas	VK6KWN VK6AFA VK6OO	146.700 FM(R) Perth, at 0930 hrs Sunday, relayed on 3.560, 7.075, 14.115,14.175, 21.185, 28.345, 50.150, 438.525 MHz Country relays 3582, 147.350(R) Busselton 146.900(R) Mt William (Bunbury)147.225(R) 147.250 (R) Mt Saddleback 146.725(R) Albany 146.825(R) Mt Barker Broadcast repeated on 3.560 at 1930 hrs.	(F) $59.00 (G) (S) $47.50 (X) $32.00
VK7	Tasmanian Division 148 Derwent Ave Lindisfarne TAS 7015	President Secretary Treasurer	Tom Allen Ted Beard Peter King	VK7AL VK7EB VK7ZPK	146.700 MHz FM (VK7RHT) at 0930 hrs Sunday relayed on 147.000 (VK7RAA), 146.750 (VK7RNW), 3.570, 7.090, 14.130, 52.100, 144.100 (Hobart) Repeated Tues 3.590 at 1930 hrs	(F) $65.00 (G) (S) $52.00 (X) $38.00
VK8	(Northern Territory) is part of the VK5 Division and relays broadcasts from VK5 as shown (received on 14 or 28 MHz).					

Note: All times are local. All frequencies MHz.

Membership Grades
Full (F) Pension (G)
Needy (G) Student (S)
Non receipt of AR (X)

Three year membership available to (F) (G) (X) grades at fee x 3 times

he was a member of the official Australian delegation to the JIWP meeting.

WARC 92 is a major theme at most IARU meetings and Conferences, and the IARU is coordinating the approach of all societies concerned with protecting the interests of all amateurs.

Import Duty Exemptions

From time to time the WIA receives inquiries from members who wish to bring transceivers back to Australia after an overseas trip. These members usually wish to know how they can avoid paying import duty on amateur equipment for personal use.

Since 1984 the WIA has had a hard-won authority from Australian Customs and DoTC to certify that transmitters and transceivers, which meet the agreed guidelines for amateur use only and cannot be easily modified for use on other bands, can be exempted from import duty.

However, under the terms of the agreement, certification applies to the importer and the type of equipment jointly, not to the equipment only. What this means is that "John Smith" can obtain an import duty exemption certificate for a "Mark X" transceiver (provided the transceiver meets the criteria), but that certificate will not allow "Jack Bloggs" to import an identical "Mark X" transceiver. "Jack Bloggs" will need to apply for a separate import duty exemption certificate.

As the WIA has to submit each application for an import duty exemption certification to professional consultants, the fee, currently $167.00, is the same whether it is a dealer importing 50 units, or an individual amateur importing one unit.

Therefore, unless you pick up a rare, substantial bargain overseas, it is generally cheaper to buy a new transceiver from an authorised dealer in Australia. It is certainly a lot less hassle, and there is no uncertainty about warranty.

Front Cover Photographs

Following the recent request for photographs suitable for publication on the front cover of Amateur Radio magazine, we have received several interesting and potentially useful contributions, some with articles attached. However, there is always a need for photographs for Amateur Radio magazine, and they are welcome whether or not we have run an appeal.

Primarily the Publications Committee is looking for photographs with a subject matter of interest, preferably quality positive transparencies or prints with good definition, and with a composition which matches or can be cropped to fit the proportions of the cover and with scope for overprinting without diminishing the picture. As you can see, not every photo, no matter how good, is suitable for the front cover, but can often be used in the body of the magazine.

And don't forget. A fee is paid for every photo used on the front cover of Amateur Radio magazine.

Morse Code Lives

The second IARU Region 1 High Speed Telegraphy Contest will take place in Neerpelt, Belgium over the weekend of the 4th - 6th of October 1991. The event is being organised by the Union der Belgischen Amateurfunker (UBA). Although this is a Region 1 contest, member societies from other IARU Regions may take part as "Unofficial teams". At this time, CRSA, JARL and KARL from Region 3 have indicated an interest in competing.

Any group interested in arranging a WIA team will find the rules published in the documents of the IARU Region 1 1990 Conference, which was held in Torremolinos, Spain, or may write direct to:-

Mr. Anton Mandos, ON6NL,
Truyenstraat 12,
B-3460 Molenbeersel,
Belgium.

Golden Antenna Award

Each year for the past 9 years the town of Bad Bentheim in Germany has awarded a "Golden Antenna" award as a symbol of outstanding humanitarian achievement in the field of amateur telecommunications. This honour has been conferred on amateurs from a number of different countries.

The 10th award is to be made at the 23rd German/ Dutch Radio Amateurs' Congress in Bad Bentheim from 22nd to 25th August 1991, and all amateur telecommunications organisations are invited to submit nominations.

Do you have a nomination for an Australian amateur who has made an "outstanding humanitarian achievement in the field of amateur telecommunications"?

Australian Standards

The March 1991 issue of The Australian Standard, the journal of Standards Australia, includes in its publication list DOC 3000R/7 1991 Rulings to SAA Wiring Rules (AS 3000-1986) seventh group.

This update may be of interest to a number of members of the WIA.

The "Drafts for Comment" section also includes minimum requirements for fixed and portable units used with the second generation cordless telephone common air interface system.

160 Metre Event

The Hastings Branch of the NZART, ZL2BEI, recently advised that, in an endeavour to "liven up" 160 m again, national and international advertising has occurred inviting the participation of other amateurs to a "have a go" event on 160 m. This follows last year's unsuccessful event on 160 m.

The frequency to be used for this 1991 event is 1850kHz +/- 10 kHz (SSB or CW).

The time is to be 2000 to 2400 hrs NZT (1800 to 2200 hrs EAST).

The dates are 21st and 22nd June 1991.

See if you can borrow a crane or tower or even load up your 80 m antenna. The New Zealanders would be pleased to work you.

Band Plans and Agreements

Geoff Wilson VK3AMK, in a recent letter notes that the release by DoTC of the sub-band 50.050 - 50.200 MHz to Australian amateurs on the east coast has allowed reception of some "stunning long haul DX", with "once in a lifetime" openings to areas such as West Africa and frequent openings to Europe, 9L1, 6W1 and KL7 from various parts of Australia.

One of the major intentions behind the battle to gain this sub-band was to be able to use it for international DX. Geoff's concern is that the frequencies are being used for local, short distance contacts, contests or "rag-chews" which could just as well be conducted on the 52.000 - 54.000 sub-band, where the amateurs are the primary service. He suggests the following guidelines for 6 metre operators. What do you think?

1. DoTC allocated 50.050 - 50.200 MHz for Australian stations to participate in working **International DX**.
2. Two modes only to be used, CW and SSB.
3. 50.110 MHz is an internationally recognised **DX calling frequency**, should be used for that purpose **only** and **shared** among operators, and should be used with extreme discretion and care.

4. 50.050 - 50.100 MHz to be used for **CW** mode only.

5. 50.100 - 50.200 MHz to be **shared by CW and SSB** modes.
6. The Amateur service is the **Secondary** service between 50.000 MHz and 52.000 MHz.
7. Most important of all, **50.050 - 50.200 MHz to be used for International DX working purposes, not for either inter-state or intra-state operation.** Every VK call area has full access to 52.000 - 54.000 MHz, and this section is perfectly adequate for both inter-state and intra-state operations.

It would be a pity if Australian radio amateurs lost the use of this band because of poor operating practices. Geoff pleads that the dedicated 6 metre DX enthusiasts would appreciate the co-operation of the non-DXers.

Electromagnetic Interference Review

DoTC recently announced the forthcoming release of a paper canvassing issues relating to electromagnetic interference and outlining a strategy for management of the problem. Industry will be invited to comment. We trust that the WIA will be invited to do likewise.

VNG Frequency Change

Marion Leiba, VK1VNG/BNG, Honorary Secretary of the VNG Users Consortium, advises that *"Our standard frequency and time signal service, VNG, is about to change frequency. It has been issued a permanent licence on 16 MHz to replace the temporary transmission on 15 MHz. The 15 MHz broadcast is expected to cease at 0700 UTC on 6th May 1991. Transmission on 16 MHz should commence at 0000 UTC on 8th May 1991. The mode will be double-sideband, full carrier amplitude modulation, at 10 kW power. The aerial will be a quadrant with a single strand of wire on each arm.*

VNG is now licensed permanently on both 5 and 16 MHz. We are negotiating for frequencies to replace the present temporary 10 MHz transmission. Inquiries and reception reports may be sent to:

VNG Users Consortium
GPO Box 1090
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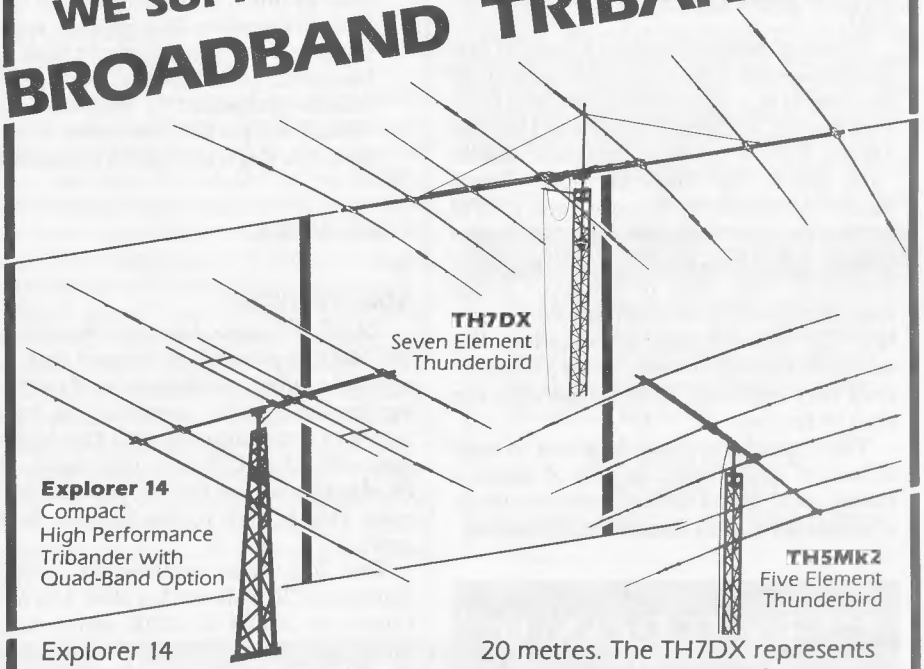

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Is Your Equipment Identified?

Do you have recorded in a safe place the numbers of **ALL** your amateur radio equipment? Could you identify an item even if the serial number had been removed? Is your insurance cover adequate? What do you do if some of your equipment is stolen? How do you react if offered equipment you suspect to be stolen?

These questions became a topic of discussion in the Executive Office recently as a result of a fax recently received from Henry Kop, VK5KUJ, reporting that the Lower Eyre Peninsula Amateur Radio Club shack had been burgled. Items stolen include three transceivers, a VFO and a computer and disk drive. They are listed in detail in the *Stolen Equipment* section of this issue of Amateur Radio magazine, and have been processed into the WIA Stolen Equipment Register. We certainly hope that these items are recovered very soon, and sympathise with the club in its loss.

The procedures to be followed in case of loss of equipment, or sale of suspect items, were given in the February issue of Amateur Radio magazine. However, to summarise:

1. Inform the Executive Office at once, in writing, if you do have items stolen, giving details of manufacturer's name, model, type of equipment, serial number, date stolen, owner information, any identifying features or modifications and police contact.
2. If offered an item which you suspect of being stolen, check with your Divisional Office or the Executive Office with as much detail as possible of the item in question. If it appears to tally with an item on the register then that becomes a police matter. Naturally, if stolen equipment is recovered, you should inform the Executive office so that the Register can be amended.

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Club Talks to Space Shuttle

RAAF Williams Amateur Radio Club, VK3APP, a recently re-formed club, has created a substantial amount of publicity for amateur radio operation in its attempt to communicate with the Atlantis Space Shuttle (STS-37) on 6th April 1991. Students from the RAAF School of Radio were able to talk to the Shuttle during orbit 14.

The link was established using a Kenwood TR-9130 with a DSE 100W 2m linear, an ICOM IC-3210 and a simple antenna system. VK3APP was one of nine stations fortunate enough to participate in the Australian Schools Special Activity Programme initiated by NASA.

As you would expect, Murphy was present during the attempt. Full details next month.

Two Become One

The Calendar of the IARU for 28th March 1991 announced that, following the re-unification of Germany, the two countries formerly represented separately in IARU, have become one country. By agreement between the two organisations, the Radiosportverband (RSV) has been dissolved and DARC (Deutscher Amateur Radio Club) has assumed all the functions previously performed by the RSV. QSL service to Y2 - Y9 stations is now provided by the DARC QSL Bureau, and all other IARU matters are being handled by DARC.

ITU Day

The International Telecommunications Union (ITU) is the oldest intergovernmental organisation in the world. Each year on 17th May the ITU celebrates World Telecommunications Day to publicise the ever increasing role of telecommunications in the world and the scope for international co-operation in technical developments.

Each year the role of the amateur community is recognised when DoTC, on request from the WIA, grants permission for each Division of the WIA to put a station on air on 17th May using the suffix ITU.

IARU Satellite Co-ordinator

Mr. Fred de Guchteneire, ON6UG, has been appointed as IARU Satellite Coordinator, a position first established in 1989, but not previously filled.

10th ARRL Computer Networking Conference

Papers are invited for this conference which will be hosted by the Northern California Packet Association in the San Francisco area on 27th - 29th September 1991. Topics will include HF packet investigations, network development, digital signal processing, digital speech, hardware, software, protocols, packet services, packet satellites and future systems. Paper guidelines and/or author's packages are available from Lori Weinberg at ARRL, 225 Main St., Newington, CT06111, (Tel. 203 666 1541, fax 203 665 7531). The deadline for receipt of camera-ready papers is 12th August 1991.

WIA International Representation Fund

Donations to this important fund received at the Executive Office in the past month have come from:

W. Amisano	VK4JCU
E. Buggee	VK3AX
B. Gall	VK2EFD
H. Ilvess	VK6YHI
A. Manning	VK7LR
L. Rice	VK6CP
A. Scovell	VK2FKE
R. Shortell	VK4ARS

Tumut and District ARC.

Executive Office Update

The recent replacement of one of the Executive Office computers, and the installation of a LAN networking all four

office computers, has greatly increased the flexibility of operations in the office and will allow improved efficiency.

Call Books

There are still a few copies of the 1991 Call book available from the Executive Office, at a cost of $9.50 each, plus postage. This is perhaps an appropriate time to remind members to ensure that their information held in the Executive Office files is correct when it comes time to commence production for the next Call Book in a few months.

Amendments to call signs are advised to the WIA monthly by DoTC, but any information about changes of address or suppression information must be submitted in writing to the Membership Secretary at the Executive Office.

WIA Meets NZART

At the end of May two delegates from the WIA will travel to New Zealand to attend the NZART 1991 Annual Conference. It is a long-standing agreement between the two societies that each sends representatives to the other's Convention in alternate years. This allows for closer co-operation and discussion of both internal and international matters, and is particularly important this year in the preparation for WARC92.

Last year the WIA was host to Jim Meacham, ZL2BHF, and Cathy Purdie, ZL2ADK, the ZL Education Officer, who was able to provide some very useful ideas on school activities connected with amateur radio.

The WIA delegates to the NZART 1991 Conference will be Ron Henderson VK1RH, and Bill Roper VK3ARZ.

WIA Members Role Identification

Because of the broad-ranging interests of our members, we find amateur radio operators involved in a number of fields not directly related to the hobby, but bringing their radio skills and abilities to the particular task, or, because of their radio background, being able to see connections not immediately apparent.

Many school teachers have been able to extend student horizons by bringing amateur radio into the classroom. For publicity and public relations purposes, it is useful if we know about activities in which the amateur operator can contribute much more than the average worker.

Please tell the WIA if you know of or are participating in such projects, either technical or social. We sometimes need to be able to specify more than disaster communications to justify our generous band allocations.

Australian Disaster Management Network

A recent newsletter from CIRCIT (Centre for International Research on Communication and Information Technologies) reports on the plans to establish a PC-based computer network to link Australian counter-disaster and leading research organisations. WICEN will be one of the active participants in the planning and testing of proposed systems.

BRENDA EDMONDS VK3KT
BILL ROPER VK3ARZ

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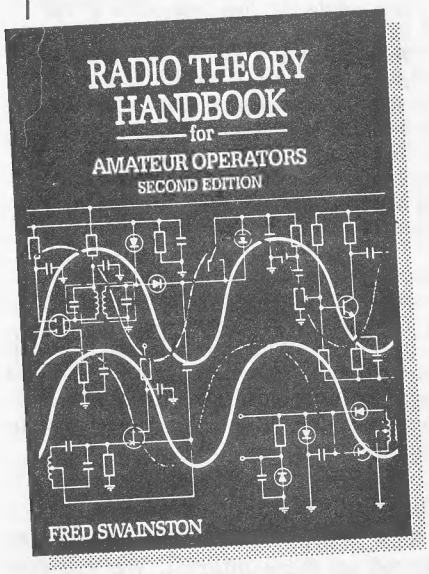

This book details the radio theory and practices necessary to obtain the **Department of Transport and Communication Novice and Amateur Operator Certificate of Proficiency.**
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Random Radiators

RON FISHER VK3OM AND
RON COOK VK3AFW

Directivity of HF Antenna

HERE IS A SHORT ARTICLE contributed by William VK3MI on the vertical directivity of HF antennas. Over to you, William.

Many amateurs seem to have the opinion that the classical doughnut pattern, with no endfire radiation, of the free-space dipole applies to their HF installation regardless of ground effects!

At VHF this may be so, but few manage a height above ground of a quarter wavelength (λ/4) for their horizontal dipole on 80 metres, and most are closer to 1/10 wavelength (λ/10). These spacings are typical of a two-element Yagi (dipole and reflector), in this case, transmitting a cone of energy vertically toward the ionosphere some 120-400km above.

When this reflection contour is observed from a distant receiver (10-500km away) from ***any*** *direction it will appear as a slightly oblate circle with almost no observable directivity!*

As frequency is increased and, of course, a greater effective height in wavelength terms, the classical directive patterns illustrated in the texts (eg ARRL and Radcom etc) come into effect.

However, as the vertical incidence MUF only falls below 3.5MHz for the two hours prior to dawn at some seasons, the 80m band is outstanding for short to medium distance communications in our temperate zones away from the tropical summer static noise.

That part of the pattern reflected by the ionosphere from almost vertical incidence fills in the "skip zone" while that part reflected from 45-80 degrees incidence provides almost non-directional coverage out to 600km or so.

The ARRL Antenna book (chapter 2) and Radio Communication Handbook RSGB (chapter 12) discuss this and supply pattern diagrams for λ/4 and λ/8 heights and suggest gain in the vertical direction for those with a ***perfect*** *earth. However, with the clay at this QTH baked to porcelain by summer sun the losses probably outweigh any gains!*

For those with the yen for DX on the lower HF bands the vertical antenna should be the answer for radiation at low angle with a "cone of silence" immediately above. "Skip distance" between local radiation and reflected signal then occurs in the intermediate zone covered by the horizontal dipole and accounts for some of the poor signal reports between the two.

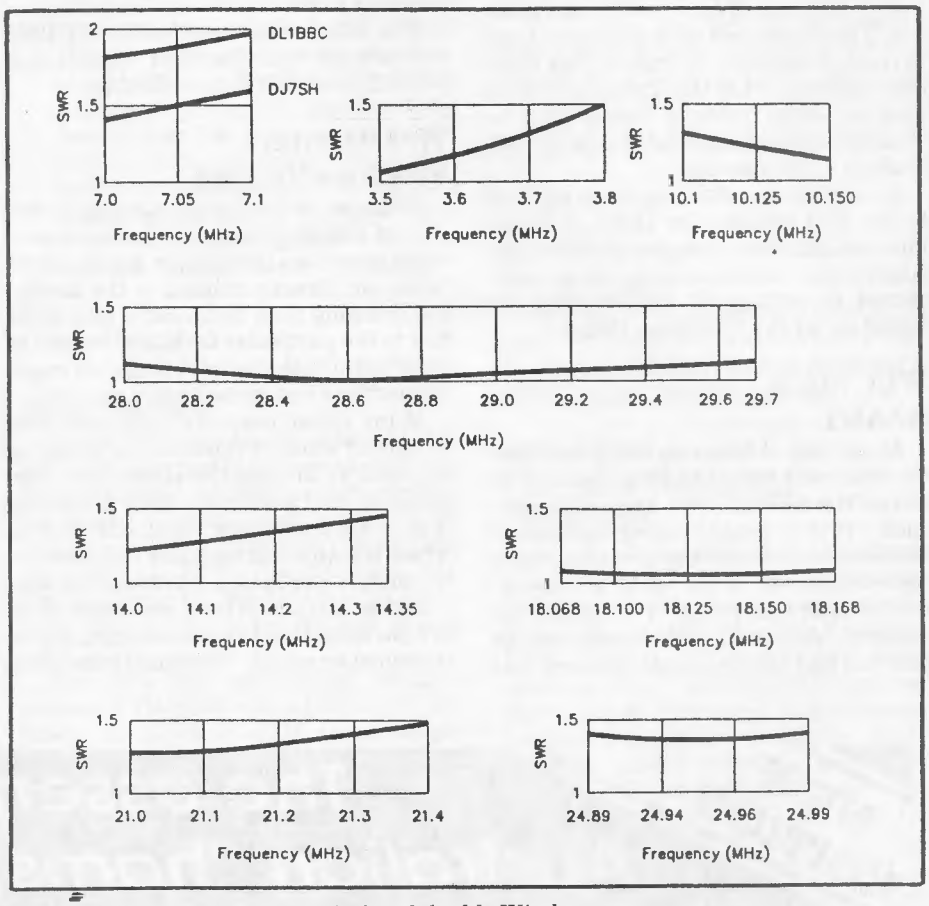


Fig 2: SWR curves for the eight-band double Windom.

Altitude remains the physical problem while the loss resistance of the earth connection is the electrical one. Rod and driven pipe earths can vary from 10 ohms in a salt marsh to 50 or 100 ohms in clay or sand so the distributed earth of a metallic pipe water supply is preferred but, particularly for received noise, should be separated as far as possible from the electricity supply earth on these same pipes.

With all these problems is it any wonder some prefer to operate portable from a quiet country location with a random wire antenna!

In a later article we will look at verticals and the reasons they sometimes don't work as expected. In the meantime, further contributions on the subject are encouraged.

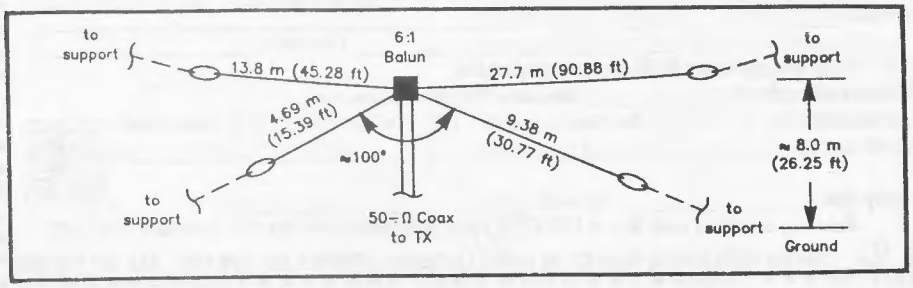


Fig 1: Double Windom

Quads vs Yagis

The article in our last column has stirred up some interest. We will give this some further attention in the next column. Further contributions are welcome.

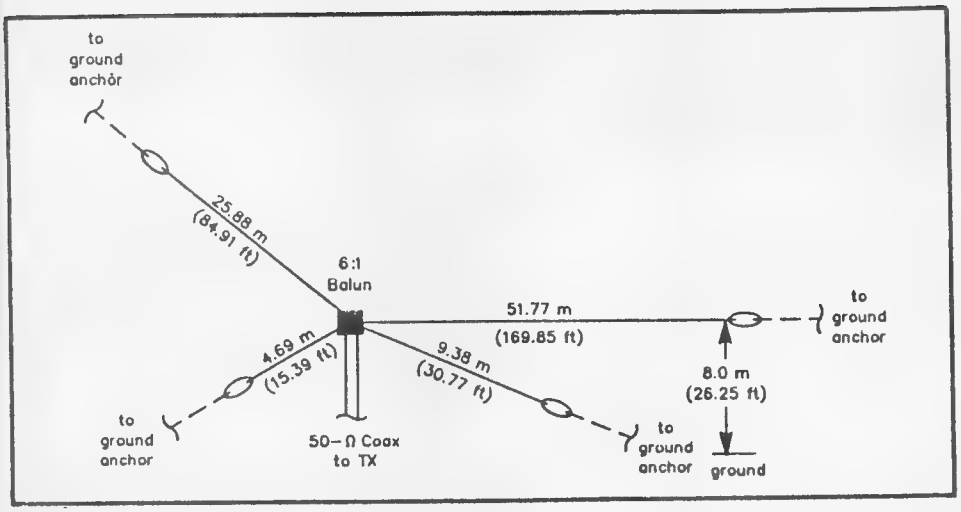


Fig 3: A double Windom antenna for nine bands.

The Windom Again

It seems that the most popular antenna for discussion is the Windom. Robert VK3XZ suggests that the transformer described on p36 of Jan '91 *AR* could be modified to enable 300 Ω ribbon to be used instead of 50 Ω coax. Reversing the transformer gives a step up and a reasonable match to 300 Ω. It may be advisable to use four loops of wire through the toroids to provide sufficient inductance at the lower frequencies. Of course, there is then the problem of matching the transceiver to the 300 Ω line.

Robert raised several other matters which have been taken up in direct correspondence. He also provided some copies of early articles on the original wire-fed Windom from the second edition of the *RSGB* handbook and the fifth edition of the *Radio Handbook,* 1938. Thanks, Robert.

Feedback

Charles VK2NAJ found even the VK Windom too large and so he put up one of half size, that is 33ft long with the feed point 11ft in from one end. Charles points out that wrapping the wire around the insulator reduces its length by up to 25mm and suggests allowing for this when measuring out the wire.A marking pen may be used to mark the wire prior to cutting.

Charles connected a 50 Ω coax directly to the antenna and found the SWR to be only 1.3:1 on 21.180MHz. On the 14MHz band the VSWR was about 5:1 and around 3:1 on the 28MHz band. A number of good contacts were made into North America and Japan on both 15m and 10m. After using the antenna for several weeks Charles has reverted to his wire antenna, (71'-6" or 21.79m long) which he finds works well on all bands when used in conjunction with his EAT300 ATU.

Charles also forwarded an article, "DX Dipole for Restricted Sites" by G3XAA which was published in *Practical Wireless,* March 1982. A precis follows.

For restricted QTHs a dipole is a good compromise, being cheap, easy to build and not a significant impact on the neighbours' view. Some QTHs prevent the erection of a dipole aligned to give maximum signal toward a favourite DX location. Making the dipole more than one half-wave long produces lobes, with some gain, at various angle to the wire axis.A dipole 20.003m long is resonant on the 40, 20, 15 and 10m bands, and this gave lobes toward the target area. G3XAA was unable to use centre feed and selected a feed point 3.334m from one end. Fifty Ω coax was used directly, and a VSWR of 1.6:1 was obtained at 21.30MHz.

Comments

This is essentially a ¾ wavelength dipole-fed ¼ wavelengths from one end. The use of direct coaxial feed for off-centre-fed antenna is not recommended, especially if multi-band operation is intended. A toroidal RF choke can be made by either slipping four small ferrite cores over the coax close to the antenna or looping the coax through a larger core four or five times. The latter will present a heavier mechanical load and may be a problem for dipoles supported at the ends only. The objective is to provide a choke for the currents that try to flow on the outside of the coax. The currents inside the cable will not be "choked" but will be forced to be equal in magnitude or balanced. Waterproofing will be required.

Multi-band operation will be possible with an ATU. The Windom achieves multi-band operation without an ATU, but does not cover all bands.

Questions and Answers

Now for some answers to other points raised by various other readers. Teflon-insulated wire is not absolutely necessary for the transformer and any insulation suitable for RF use may be used.

The core material can be varied. There is a wide range of materials from different sources which may be used. All that is required is a material with low losses over the frequency range to be used and a permeability of, say at least 50. Reducing the permeability means that a larger cross section or more turns are required to keep the winding inductances several times greater than the load to be connected across it. The objective is to have most of the current flowing in the load and not providing magnetising current or core loss current.

Yes, it is possible to connect a coaxial cable directly to the feed point. However, then an ATU will be necessary on all bands, and it is almost certain that a considerable amount of RF current will flow down the outside of the coax, giving additional radiated signal. This might be useful for DX working or it may cause RF feedback in the rig and create other problems. In general, except for emergency operation, we cannot recommend direct connection of coax to an off-centre-fed dipole.

Why aren't the resonant frequencies exact multiples of the fundamental resonance? It all has to do with the end effect. An infinitely thin dipole in free space has a resonant length L_f given by:

$L_f = 492/f$

where f = frequency in MHz and

L_f = length in feet

A real antenna made from wire is about five per cent shorter for the same resonant frequency. In practice the small capacitance across the end insulators will also reduce the resonance length. For a typical wire this gives:

$L_f = 468/f$

where f = frequency in MHz and

L_f = length in feet

If there is more than one half-wave then the length for harmonic resonance needs take into account only the end effect on the two outermost quarter-wave lengths. Thus the second harmonic frequency is slightly higher than twice the fundamental.

The formula given in various ARRL publications is:

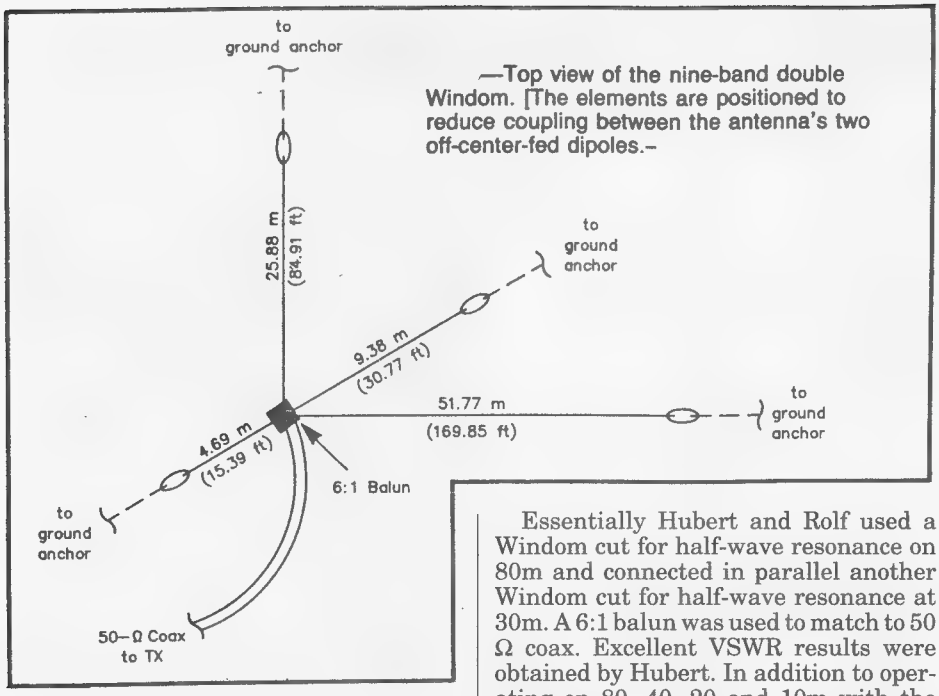
$L_f = [492(N - 0.05)]f$

where N = number of half-waves

Table 1 illustrates the point more clearly

Table 1 Resonances of a Dipole – f in MHz

Fundamental	Harmonics						
	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth
3.435	7.050	10.665	14.281	17.896	21.512	25.127	28.742



—Top view of the nine-band double Windom. [The elements are positioned to reduce coupling between the antenna's two off-center-fed dipoles.–

Fig 4

It is interesting to note that the dipole has resonances close to all the recently allocated "WARC" bands.

More Windom Designs From Canada

After writing the earlier article on the VK Windom, two other articles on the Windom came to my attention. In the August 1990 edition of *QST* there was an article by John Belrose VE2CV and Peter Bouliane VE3KLO titled "The Off-Centre-Fed Dipole Revisited: A Broadband Multiband Antenna".

The article gives a short historical background on the Windom and the search for a dipole which would give low VSWR from 3.5 to 4.0MHz. It claims a 460kHz 2:1 VSWR bandwidth for an 80m dipole fed with a 6:1 balun. Excellent broadband results were reported in the 40, 20 and 10m bands. Results for a 4:1 balun were also reported. While the 6:1 balun gave better bandwidths, the 4:1 balun gave lower minimum VSWR in the 80 and 40m bands. This suggests that the impedance of the Windom is nearer 200 than 300 ohms on those frequencies which is in general agreement with the VK Windom article.

From Germany

An appendix to the previous article reproduces a translation of "Eine Doppel-Windom Antenna für Acht Bänder" (A Double Windom Antenna for Eight Bands), by Hubert DJ7SH and Rolf DL1BBC published in CQ-DL, September 1983, p427.

Essentially Hubert and Rolf used a Windom cut for half-wave resonance on 80m and connected in parallel another Windom cut for half-wave resonance at 30m. A 6:1 balun was used to match to 50 Ω coax. Excellent VSWR results were obtained by Hubert. In addition to operating on 80, 40, 20 and 10m with the larger dipole, the second dipole gave operation on 30 and 15m. The surprise was a low VSWR on the new WARC 17 and 12m bands. Not to be content with that, the pair replaced the longer dipole with one cut for half-wave resonance on 160m and obtained a nine-band double dipole system.

The main dipole was 8m above ground and the smaller dipole was an inverted vee configuration with the arms at an angle to the main dipole to reduce coupling between them. See figures for details.

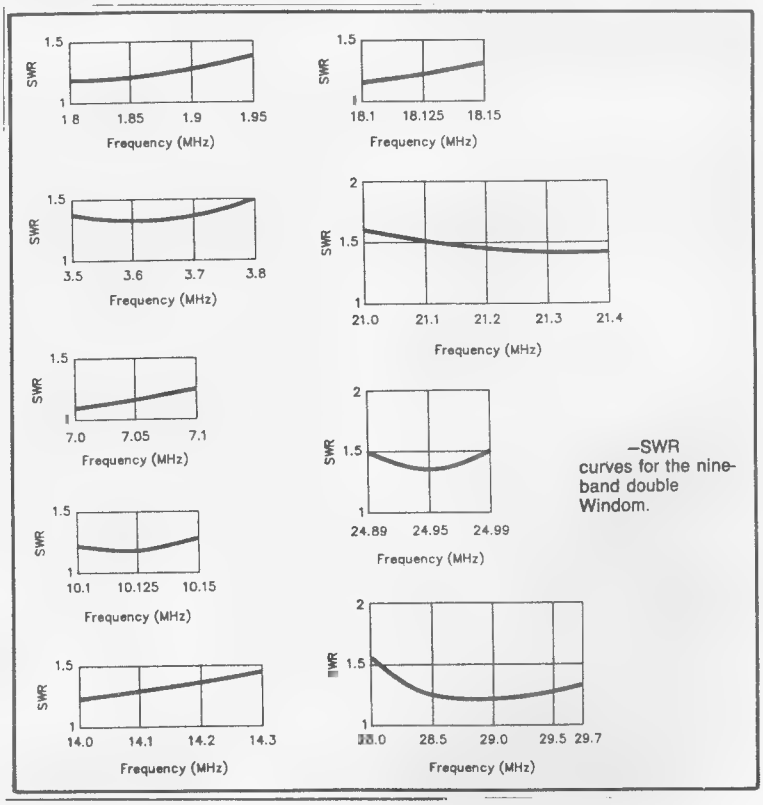
From Italy

In the October issue of Radio Revista there is an article (pp 30-31) on the Windom by Umberton IK5CLX. He describes a modified 4:1 balun, tapped so as to give 6:1 transformation. The dipole is made from 2mm diameter wire, 83.5m long and fed 30m in from the end than would be expected for the "normal" Windom.

The article includes a VSWR curve which seems to be a bit too good to be true. The worst case is only 5.5:1 at 5MHz in the span 1.5 to 30MHz. In the amateur bands, the bands 80, 40, 20, 17, 12 and 10m all show less than 1.5:1, with 160m giving about 1.8:1, 30m 3.5:1 and 15m 2:1. The theoretical VSWR is very much higher and the only explanation we can provide for the lower reported values is the presence of losses that have lowered the effective Q of the system. Whether these losses are in the balun or the immediate environment, we cannot say. Standing-wave antennas normally have off-resonant or anti-resonant measured VSWRs of at least 10;1.

Well, that's all for this time, so it's 73 from me and 73 from him.

(Diagrams are reproduced from QST August 1990 - ed) **ar**



–SWR curves for the nine-band double Windom.

Fig 5

Tool Sharpening

VIC JOYCE VK2EVJ
17 PRESCOTT AVE, DEE WHY 2099

THERE IS NO SUBSTITUTE FOR sharp tools — scissors, knives, drills, chisels, screwdrivers, paper trimmer, garden tools etc, and a little application can work wonders. There are principles and rules for the sharpening of all tools, but a lot of them apply to several.

Warning! Always wear safety glasses or use clear plastic guards when using power grinders. Note that some tools can be sharpened with a file; a diamond file can be especially effective, even for final shaping of a drill! Be careful because they are expensive.

Knives

The degrees of sharpness possible depends on the material, a surgeon's scalpel has the steel for the finest edge, lesser steels have to be proportionally more obtuse.

The finer the edge is, the longer it will stay "sharp". You have to learn how fine you can sharpen your particular knife: those with break-off sections can be finer than fixed blades; carving knives can be quite fine; but stainless steel fishing or table knives can't hold that fine edge and will need sharpening more often.

Illustration (a) represents soft material. Notice that a little wear on the tip makes it very "blunt" and that will happen quickly because of the softness of the metal.

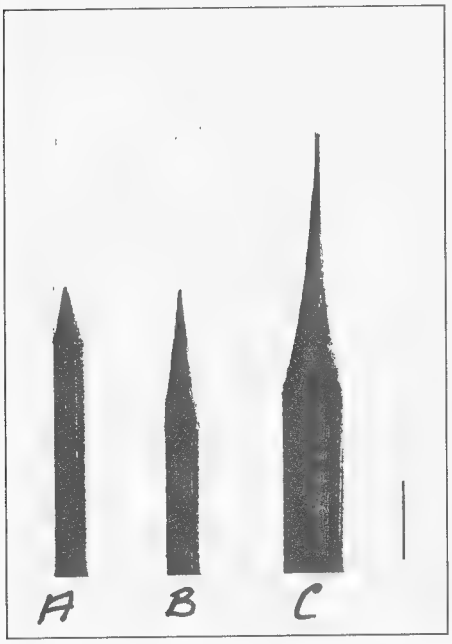


Illustration (b) represents a hard steel knife. Here the finer edge allows more use before becoming blunt and this is helped by the hardness.

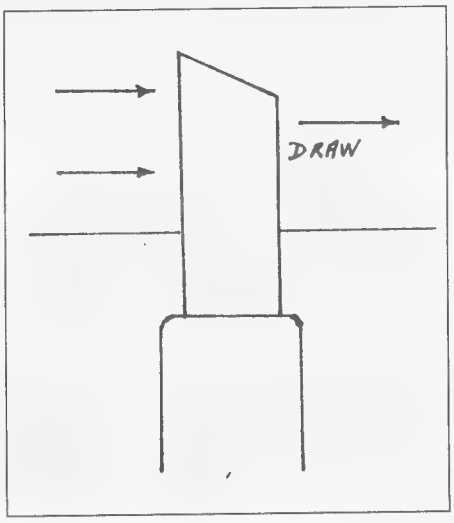
Illustration (c) is a "hollow ground" knife. This is done by grinding on the curve of the wheel so it curves out some of the body of the knife, it applies to some carving knives. You can see how this gives them extended "sharpness" and how easy it is to keep them sharp with occasional honing, usually with a "steel". This steel is really a file and needs to be in good condition. An extremely effective new "steel" has a diamond dust surface.

An occasional rub each side of a "steel" will usually keep such a carving knife very sharp for years.

When the edge has gone from a kitchen knife you can see a shine on it. Be sure not to abuse a knife by cutting down on to crockery; you will commonly find the tip worn badly through this and it could need grinding to reshape.

A power grinder can be used to shape a knife very quickly, the resulting "rough" edge shaped on a coarse oilstone then honed to a "keen" edge on the fine side of the oilstone. However, the coarse side of a stone is usually sufficient for the shaping.

The sharpening angle is very critical. Use a light oil on the coarse side of the oilstone, spring the blade to get good pressure on the edge and work well across the stone until you can feel a burr on the opposite side. Use as much of the surface of the stone as possible to wear it evenly.



When both sides have been shaped, do the finish honing on the fine side. Bear in mind that drawing across or working up and down will give the finest edge.

Break-off tip blades are very hard steel, so will carry an excellent edge, but breaking tips off means that in short time you have either a short blade or have to go down the street for another! It is far better to re-sharpen. While working, an occasional hone by drawing the blade across a quite dry stone will keep the edge very sharp for you.

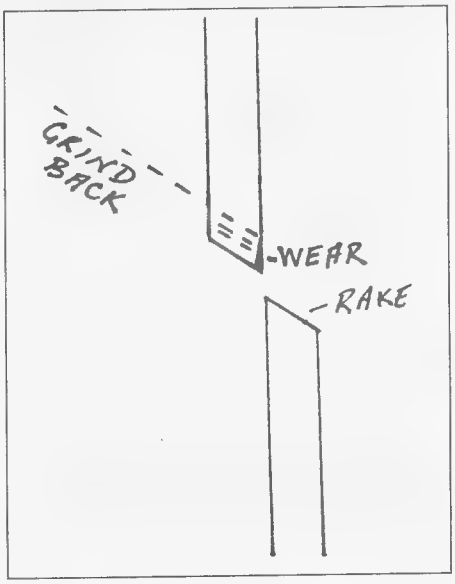
Scalpel blades are used by artists for "scraping" images and cutting, and are commonly thrown away; but again, it is easy to hone them to an excellent working edge again by simply "drawing" them across a fine oilstone.

In days gone by we sharpened "cut-throat" razors on a quite smooth "wet stone". Some safety blades can be sharpened by working up and down in a glass of water!

Scissor Action Tools

The very nature of these means that they will tend to cut away some of their own metal! Look very carefully to see if this happened, then grind away the worn section as necessary.

They all have different "rake" angles: some gardening tools have very sharp angles, maybe on one of the blades; scissors have a medium angle on both; tin snips have almost no angle; paper trim-



mers have little angle and need very careful grinding to keep the cutting edge straight.

Establish these angles before grinding; keep the tool cool by dipping in water frequently, and practise till you can grind a neat line. Finish on an oilstone where appropriate.

All scissor blades have to be angled towards each other so there is good contact for the length of the blade. Check and oil all of the pivot system: with scissors, the pivot must be neat but not tight; the blades curved or bent slightly towards each other so contact at the end is the tightest, but not so as to make operation uncomfortable. If scissor pivot is too tight, it may be necessary to hold the rivet over a hole while tapping it with a hammer.

Machine Twist Drills

First, establish the angle of the tip for holding the drill to the wheel. Make sure the sides of the drill are not worn through using while blunt or drilling into extremely hard materials. The tip will have to be ground right back to good sides.

Second, consider the rake on the cutting edge: normally this is due to the twist in the drill, but you can change it by grinding. For instance, if drilling brass, you would reduce it to almost nil.

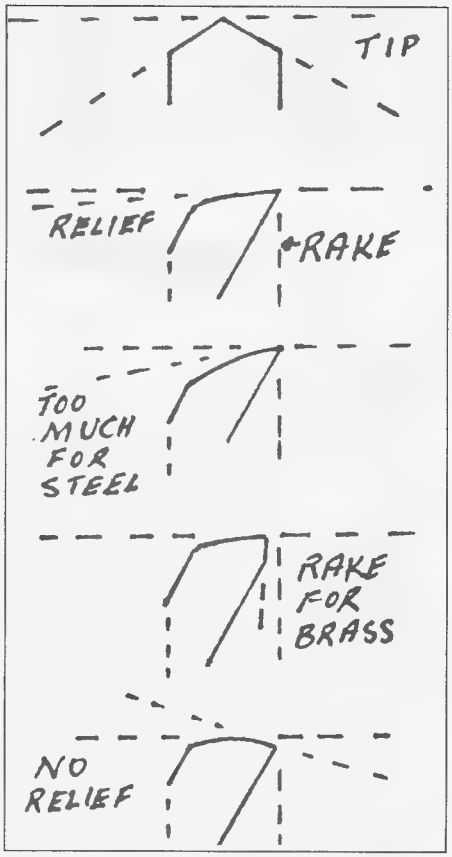
Third, the "relief" behind the cutting edge. This controls the penetration and is the most critical part for resharpening. Obviously, unless the edge is sharp and there is relief behind it, there is no way the drill can cut. Because it is designed to cut into hard materials the relief cannot weaken the edge significantly, but still must allow reasonable penetration.

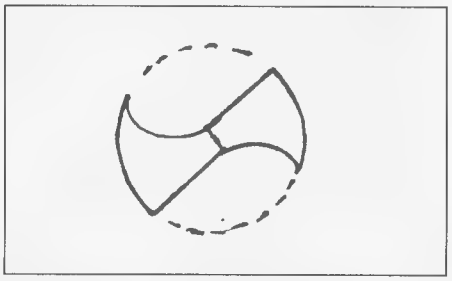
Because you are grinding a round drill on a flat surface you will have to rotate it so the relief is continued to the back edge.

Lastly, there is the entrance part of the drill, the peak at the centre of the tip. It cannot cut, so has to be forced into the material being drilled. A pilot hole is often made with a smaller drill which, of course, has the same problem, but much smaller. If the peak is not centred the drill will swing around the peak and make the hole larger than it should.

Looking at it from the end, you will see that the drill is thinnest in the middle, so the aim is to have the peak across this part. It is very easy to grind so this peak goes anywhere but straight across. Some drills are comparatively thick in the centre and can be improved usefully by grinding away some of the back of each side.

It is also important to have the two sides identical so the drill will start easily in a punch mark and drill a hole no bigger than it should. There are machines for engineers to handle all the





sharpening with amazing accuracy, but for job drilling you should be able to get respectable results by hand.

Keep practising; you will find that you need a twist plus a push motion to get the best result, which I am sure you will find is far better than with a cheap "drill sharpener".

Chisels and Planes and Screwdrivers

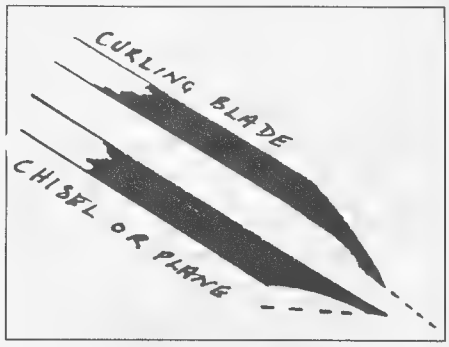
Chisels should definitely be hollow ground, leaving a little for honing. Practise grinding neatly across the blade. Hone finish with coarse, then fine, stone. When removing the burr, keep the blade perfectly flat so you do not put any angle there.

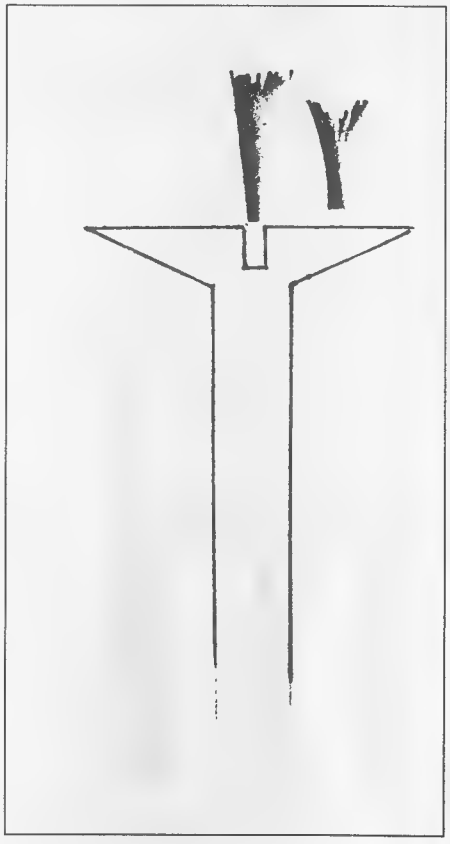
Plane blades are sharpened in the same manner; you will be glad that you spread the wear on your stone as you hone these wide blades. There must be absolutely no wear on the back of the blade.

Also on the blade is mounted a device to curl the shavings while it holds the blade. It also must be sharpened very carefully. The front edge absolutely has to contact the blade or shavings will go under it and jam there. Finish it by honing on the edge of the stone. It should be set about 1mm behind the cutting blade.

Screwdrivers when new usually have a straight taper completely different from the parallel sided shape of a slot in a screw. With any movement, and especially with round-head screws, this 'driver will tend to ease out of the slot and eventually become sharpened to a knife edge (and dangerous).

Hollow grind each side so the end thickness matches the slots for which you use the 'driver, and grind the end square. Don't worry about the burr, it will help to hold the screwdriver in the slot. **ar**





Getting Started with Amateur Radio Satellites

Part 4

BILL MAGNUSSON VK3JT
359 WILLIAMSTOWN RD YARRAVILLE 3013

I WONDER HOW YOU GOT ON WITH RS-10/11? Last month I discussed its orbit, looked closely at the transponders and improved our satellite station to the stage where we could start to make contacts.

This month I'll look at the role computers have come to play in amateur radio satellite communications. In particular, orbital predictions and telemetry decoding and display. Flavour of the month satellite is Oscar-10, the first of the elliptical orbit birds.

In May 1985 I attended a lecture at Box Hill TAFE college. It was delivered by Dr Karl Meinzer DJ4CZ, the "father" of Oscar-10. Karl was on his way to a conference in ZL. All who attended were fascinated by his story of the development of AO-10. Towards the end he reached into his pocket and produced a computer no bigger than a pocket calculator. He pushed a few buttons and told us exactly where Oscar-10 was at the time. This was pretty astonishing stuff in '85. Of course we all wanted one right then. It was some time before they appeared on the retail scene and, in the meantime, Karl's program had been published and was widely used. Eventually we found how to generate the required data to make it run, and many satellite operators came to find these little computers invaluable.

Many amateurs were introduced to the mysteries of computers using one of these Sharp PCP-1200 series devices. Indeed, they're still popular and widely used. Larger machines were very expensive in '85 and, looking back, it's remarkable how the power of computers has increased in the past five years whilst the cost has come down to the stage where $2000 now buys a quite powerful machine.

As better computers became available to amateurs the search began for suitable software, ie programs. The first tracking program freely available to amateur operators was "basic orbits" by Dr Tom Clark W2IWI. Tom is currently President Emeritus of Amsat-NA. He's the Grand Old Man of amateur satellites. His program made us become familiar with terms like Keplerian elements and details of orbital mechanics.

As time goes on many more ways are being found in which computers can aid amateur satellite operators. I'm going to take you through two of the most important this month. They are orbital predictions and telemetry decoding.

All satellite orbits are more or less elliptical. The so-called circular orbit birds in fact have slightly elliptical orbits. Even the geo-stationary orbit of AUSSAT is very slightly elliptical, (0.0002248). Tom Clark's program was based around equations that first calculate the satellite's position around the elliptical orbit and then compared its position with that of the observer on Earth. It then calculates the antenna pointing co-ordinates. To do this it needs to be able to fix the plane of the orbit with reference to the axis of the Earth. It also needs to establish a starting point, the point of closest approach to the Earth or perigee. The opposite end of the ellipse is called the apogee.

An accurate point in time and seven variables have to be entered into the program to describe the orbit accurately enough for our purpose.

I'm not going to describe these variables in detail. There are plenty of books on the subject with as much detail as you can cope with. But I'll name them. They are: Epoch (time), Drag, Inclination, Right Ascension of the Ascending Node (RAAN), Eccentricity, Argument of Perigee, Mean Anomaly and Mean Motion. Other things like object number, orbit number, beacon frequency etc, may be called for, but those eight are the ones that describe the orbit.

The program works on them, giving a starting time and comes up with a series of print-outs giving details of when and where the satellite is in our sky. It will calculate time of acquisition, elevation and azimuth bearings in degrees as well as transponder schedules, Doppler shifts and, in later programs, satellite off-pointing angles. The programs can work out whether the bird is in daylight or not, how much sunlight is falling on the solar cells and all this can be projected into the future up to a year or so for the high-altitude satellites and a month or so ahead for the low-earth orbiters. Eventually, though, the data will become too old to be accurate. All satellite orbits change, mainly due to decay caused by friction against residual atmosphere and gravitational changes. The variables are called Keplerian Elements after Kepler. They are published regularly by NASA which keeps track of all space objects on a daily basis. The figures have to be updated in your program once a month or so. More recent programs like Satfoot, Quicktrack, Graftrack and Instanttrack have very detailed graphics screens showing the satellites moving over a map of the Earth in real time. Some allow the automatic updating of Kep elements from computer files. The latest Keps can be downloaded directly from packet BBSs, edited and auto-loaded into the program. This saves a lot of typing since some programs have up to 200 satellites in their files.

Details of these programs are available from AMSAT Australia. Don't forget to describe carefully the computer you are using as they aren't **all** available for **all** types of computer.

Many modern programs will support automatic antenna tracking interfaces. These are devices, usually a small circuit board with relays to control the azimuth and elevation rotators. The computer talks to them via signals through the serial port. In this way your computer can keep your antenna system accurately pointed at the satellite as it passes across the sky. I'm sure that if you've already tried to conduct a QSO through a low-earth orbiter you'll appreciate the advantage of this feature. That is unless you've already grown another two sets of arms.

Now, on to another use for your computer. Amateur satellites use a variety of formats for downlinking their telemetry. The signals are usually FSK or PSK. The transmission is usually FM for FSK and SSB for PSK. Several different kinds of modems or kits are available to decode the various signals. Dove uses an AX.25 type transmission so that it may be displayed directly onto the screen using a

normal packet radio setup. Once you've got the raw data it can be converted into engineering data and formatted to screen using programs like TLM-13, TELEPRO or P3C.EXE. Software is available for the UoSATs from the University of Surrey. This allows you to graph the whole orbit data directly onto screen as it's coming down from the satellite. This is particularly interesting to see up to four graphs being drawn from the downlink data stream. Monitoring telemetry data is a fascinating way of enjoying our hobby. It allows you to keep in touch with the "health" of the various birds and keep up to date with the latest information via the bulletins. These contain details of new satellites, alterations to transponder schedules and latest Keplerian elements. The latest whizz-bang modems from MFJ and AEA are able to decode most satellite telemetry so you can read the bulletins, but you'll need special software if you want to display the engineering data. Or, if you're very keen, of course, you can do that yourself from published formulae.

Our flavour-of-the-month satellite is Oscar-10. It represented the greatest step forward so far for amateur radio satellites. Tragically the first Oscar-10, or phase 3A as it was known during construction, went down into the ocean with all the other payloads when something went wrong with the rocket during launch. This almost called a halt to the amateur satellite program as well as breaking a few hearts along the way. It is a credit to Karl and his team that phase 3B went ahead and was successfully put into orbit to become Oscar-10 in June 1983.

Oscar-10 is in a highly elliptical orbit. Its perigee is a bit over 4000km and its apogee is a bit over 35,000km. The orbit has an inclination of about 26^0. Its eccentricity is about 0.6, making the orbit a rather fat ellipse. It has an orbital period of 11 hours, 39 min, 26 sec. This is all rather more complicated than a near circular orbit. It would be very difficult indeed to work out access times, azimuth and elevation bearings etc for Oscar-10 on paper. Fortunately our tracking programs have no trouble as long as the correct Keplerian elements are fed in. When you do this and study the results you'll find that Oscar-10 has a very different track across the sky than any of the previous birds. At times when we see it near perigee it whizzes across the sky rather like a circular orbit satellite, but not along a north/south track. When it is near apogee, however, it will appear to hang in the sky for several hours as its orbit almost matches the rotation of the Earth. Remember that geo-stationary orbit we looked at had an altitude of about 36,000km. This means that when Oscar-10 is out at apogee it almost stays there.

Due to radiation damage, Oscar-10 is now out of control. It switches itself off when the batteries run down and back on again when they charge up. This repeats with the seasons. It also means that only the mode B transponder operates and the antennas are pointing somewhere out into space. All these things and more were controllable before the radiation finally killed the computer's memory banks.

You can still work through Oscar-10, and next month I'll discuss the minimum station requirements. The flavour of the month will be Oscar-10's elliptical successor, Oscar-13. **ar**

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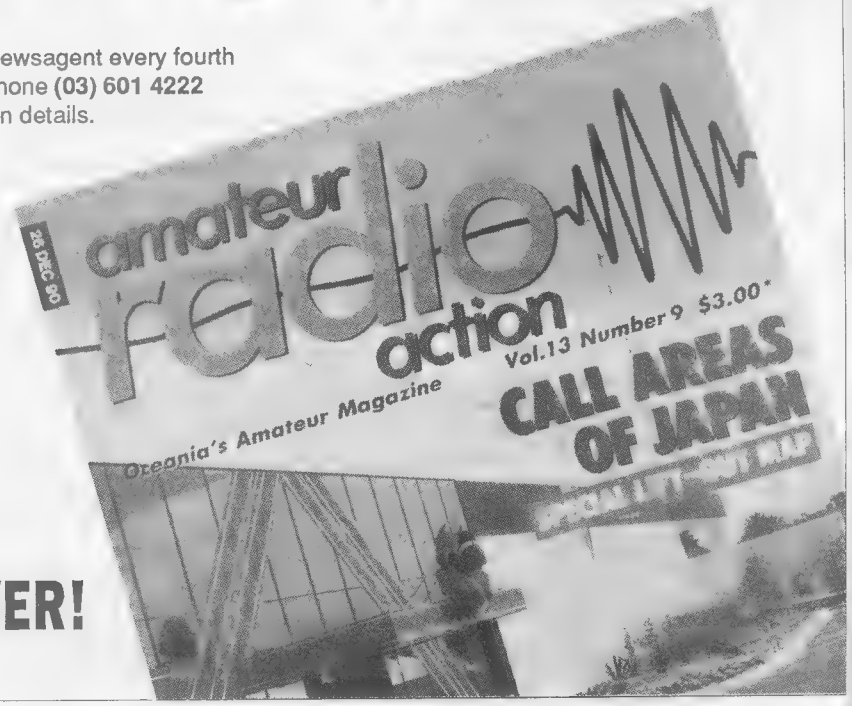

Mobile Radio Compatibility Problems in Motor Vehicles

Part 2

BY PHIL CLARK VK1PC

(CONTINUED FROM APRIL 1991)

THIS ARTICLE IS BASED ON A talk given by Paul Bell VK1BX to a meeting of the ACT division of the WIA.

When we met our imaginary amateur "Fred" in Part 1 last month, he discovered some of the pitfalls in providing power to his mobile installation. In Part 2, he discovers some more potential problems including that of compatibility with items of equipment that are becoming increasingly common in modern vehicles.

Part 2

Now when you lift the bonnet (hood?) of the modern car, the engine compartment is so full of wires and plumbing that most of us would not know where to put our eyes, let alone our hands. Added to that, many people do not like to get their hands dirty and they don't like those nasty batteries covered in acid! So they decide that they will do the installation the easy way. Along they go to the local electronic spares shop and buy a cigarette lighter plug. They will obtain the power from a more accessible source. So we plug in to the cigarette lighter and suddenly there is noise all over the place. Why is this? Let's look at this situation as shown in figure 2.

Modern ignition in motor vehicles is a high energy system. It has evolved considerably from the original Kettering ignition of many years ago. Improvements in the form of more energy into the coil, sharper pulses, less ringing, have had profound effects on the vehicle power supply. Because we don't use any more voltage than was used with the early Kettering ignition, the increased energy is made up by drawing more current. This causes noise pulses. The battery may be considered a low impedance source, and so it is, up to a point. Even the best battery still has some inductance, and this means that as the frequency is increased, the impedance of the battery is increased. In one instance Paul made a measurement directly at the terminals of the battery with an oscilloscope and was able to see 1.5 volts of ignition pulses right at the battery terminals.

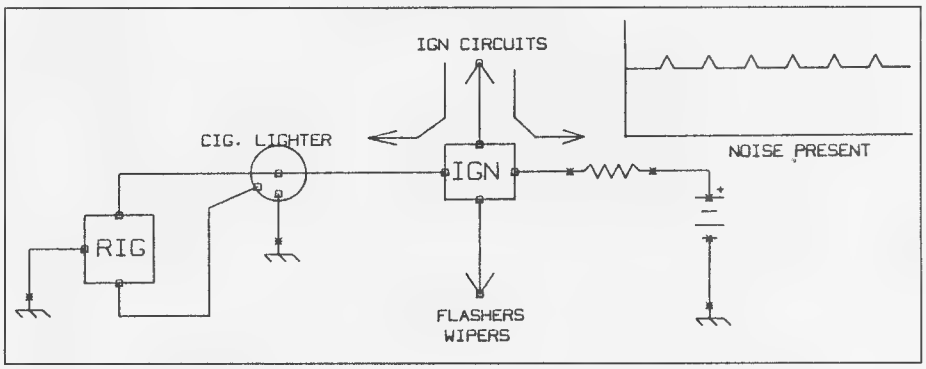

Figure 2: Noise in ignition switched circuits

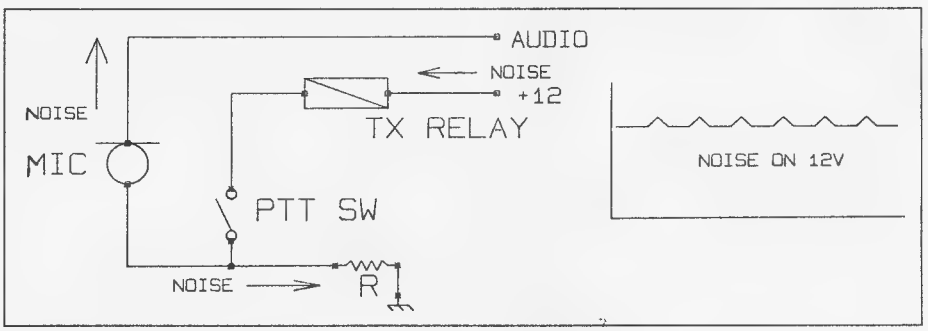

Figure 3: Noise in common circuit coupled to audio

Bear in mind that the construction of your car has been based on critical economic decisions. One of these is to not use any more of that very expensive copper than is absolutely necessary for the operation of the vehicle. Now some of the current supplying the vehicle systems will be flowing in the same circuit that you are using for your rig. As the wiring has resistance, it will cause voltage drops to be developed across that wiring. These will vary with load. This is called "noise", and could come from wipers, turn signals, ignition, fans etc, etc, etc, depending on how the vehicle is wired. **And you are going to connect your set to all of this!!** But, having made the connection via the trusty cigarette lighter socket, how much current is going to be needed when you push the transmit button? A current of 10 to 20 amps is not uncommon with many of todays rigs, and some draw even more. What is this going to do on a circuit that was only just adequate with the normal vehicle load, but which now has to try to deliver all of the extra? As an example, I tried a cigarette lighter connection with my 2m rig in my car and I had 11 volts on receive, but this dropped to 9.3 volts when I pushed the transmit button! And this was only a 25W transmitter! Besides this you have the added "benefit" of all the noise on these circuits! Whether or not your set will be affected by all of the noise comes back to the design of the radio and its power supply. It depends on what the noise rejection of the power supply is like, and some are known to be what can only be described as "abysmal".

Your set may not give any problems on receive because it has a class "B" output stage with good noise rejection, and all of the low level stages are supplied through a regulator. Figure 3 is a simplistic diagram of the transmitter keying of a set.

The audio path is shown with the microphone symbol and has a sensitivity of typically 3-5 millivolts. However, as we had shown earlier, there is already some 250 millivolts of noise with possibly 1.5 volt pulses on the battery supply. Now when the PTT button is pushed, some current will flow, either via a relay or other components, to key the transmitter. At some point in the circuit, this current may flow in a common path with the return side of the microphone. This may take place in the handpiece or later, in the set. The common circuit will have some resistance so that the current flowing will develop a voltage across this resistance (Ohm's law, remember!) which is part of the audio path, and your radio can't distinguish between this noise and your voice, so out it goes! The noise developed needs to be only a few millivolts to be the same level as your voice! This is one of the most common sources of noise injection, generally alternator whine, into mobile installations.

From the above, you can now see that cigarette lighter plugs are really a no-no for a proper installation. Where your radio **should** be connected is to those points as recommended by some of the larger mobile radio manufacturers. Some have a warning printed in large italics at the front of the manual, saying **"Do not connect the negative lead of the radio to the negative terminal of the battery".** As we have seen, there are good reasons for this. The negative lead should be connected to the chassis of the car, preferably at the point where the heavy lead from the battery and engine connect to the vehicle body. This eliminates the current path from the battery via the set back to the starter and alternator by removing R1 in figure 1 (part 1) from the radio circuit.

Having sorted out all about the negative connections, what of the positive? I have already hinted that connection of the positive lead of the radio to the positive terminal of the battery is the right thing to do, and so it is. But what if that terminal is covered in plastic, as is often the case in modern vehicles? Well, the next best place is the positive battery connection at the starter solenoid. **Do not** connect to the back of the alternator as may be recommended by some well-meaning but ill-informed types! These often use the theory that this is the obvious choice because that is where there is the least loss from the regulated output. However, the output from the alternator is far from smoothed DC because the alternator is a three-phase device with a bridge rectifier and **no** filtering, so that the output is more like a series of pulses, and it is relatively high frequency. Figure 4 shows the waveform at the alternator when the battery is connected. If you put this into the radio, you will certainly get a higher average voltage, but at the cost of increased noise.

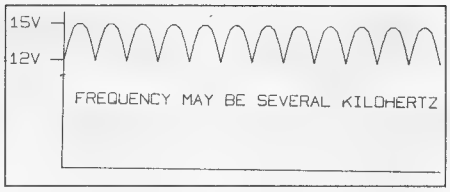

Figure 4: Alternator output into battery

What other sources of noise are there? One of these is common to the "quick-fit" mobile installation. What is this? This is the installation where a "gutter-grip" antenna or similar is used, a cigarette lighter power connection (which never did work the best, anyway), and the set resides on the seat. The "gutter-grip" usually has a good ground to the vehicle body, sometimes better than the lighter connector, so that the main DC connection is via the coax braid. This means that current is flowing in the outer conductor of the coax. There is electromagnetic coupling between the outer and the inner of the coax, so that the noise on the current flowing in the outer will be coupled to the inner, injecting this into the antenna input of the set. This is shown in figure 5. Although the noise may be of low fundamental frequency, much of it may have a very short rise time, so it will contain components well into the operating range of the equipment, and be received as an interfering signal.

Depending on the construction of the set, it may have quite good general rejection of low frequency noise, but be quite poor at higher frequencies. Noise may be injected into the circuits as a result of the incoming power leads running the full length of the chassis inside the case and radiating the higher frequency noise directly into the set internally, either into the audio stages, the IF amplifier or even the front end of the receiver.

The modern motor car has a considerable number of electronic devices in it both for control and running of the car and for entertainment. For example, the one of the popular makes with four-wheel steering has something like seven microprocessors on board. Each micro has its own clock, so there are several possible sources of noise or interference. There is a story of one of the large manufacturers who supplied a new fleet of vehicles to a customer who used low band VHF radio. When the radios were installed in the new vehicles, it was found that they could not be used because the radios were being "jammed". The customer took the cars back to the dealer and explained that the radios would not work in the car. The dealer said that the car was running as it should, so there must be something wrong with the radios. The car (and radio) was taken to a technician who was able to demonstrate that the radio worked except when the ignition was turned on! Tests with a spectrum analyser showed that a whole comb of frequencies was being produced from something in the vehicle. It so happened that a harmonic of the engine management processor fell exactly on the customer's frequency. When they went back to the dealer and threatened to cancel their large order for vehicles, the manufacturer sent out a field team and changed the clock frequency of all the microprocessors in these cars! Unfortunately, while this fixed the problem in this particular case, what happens to other services now that the interference generated by the processors falls on another frequency, as the cars

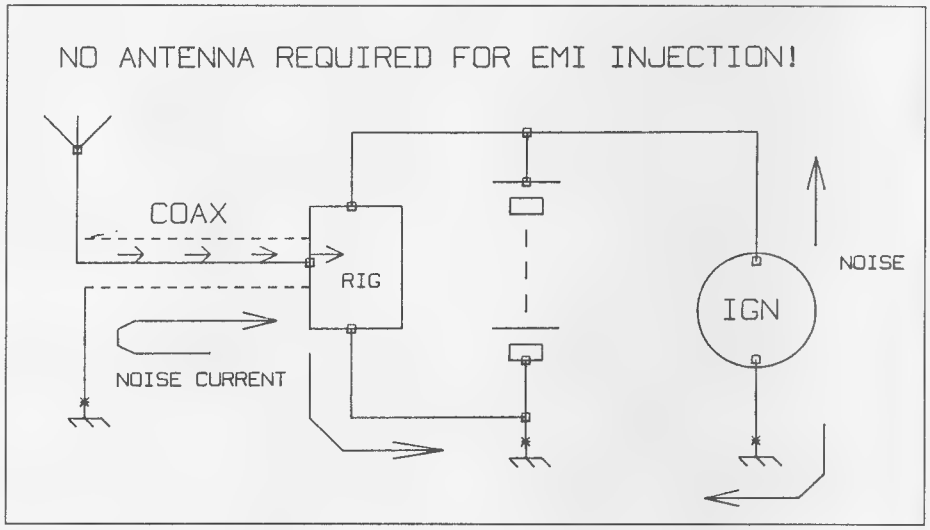

Figure 5: noise introduced onto outer and coupled to inner

drive about the country? It was pointed out to the manufacturer's representatives that there was no shielding at all on the lines into and out of the box, and they said that this was a known problem but that the cost of the few ferrites and ceramic caps to fix it would cost about $2 per unit, and this cost on 100,000 cars was too high. So here is an example of how economics can affect electromagnetic compatibility.

Then we come to the other side of the coin. What is the rejection of this equipment (vital for the control and running of the vehicle) to signals from outside? What happens when the processor responsible for braking or steering cannot get the proper inputs or is overloaded with spurious signals? I don't think I would want to be in the car, but many have little or no protection from such interference! I was told that another amateur in conversation with an electronic engineer from one of Australia's largest car makers brought up the point that some of the instruments in his car went crazy whenever he operated his transmitter from the mobile. The remark from the engineer was telling when he said, "Well, we don't design cars to have radios in them!" Paul relates the story from his days in installation of equipment of the highly regarded imported car belonging to a real estate agent who complained that the car would not run properly after the two-way radio was installed. He was able to prove that the fault was with the vehicle when he could cause the engine to shut down by holding a hand-held radio near the vehicle and transmitting! Needless to say, this caused some quite spirited discussion between the owner and the car dealer, who insisted that their diagnostic equipment showed that there was absolutely nothing wrong with the car.

Earlier in the article, I mentioned that alternators could and did cause problems. The earlier alternators required the battery to be present for excitation to be able to generate an output. The regulators were usually fairly simple, some being just on/off types. Volts too high, output off, volts too low, output on sort of thing, and this generated a pulse-width modulated output to the battery with steps between 12V and about 15V. But, what happens if the battery is disconnected from the system? Suddenly the control has no reference and the output is left full on. Without the load of the battery the alternator might produce 25 to 40 volts! Some will produce even more, up to nearly 90 volts! Obviously, this sort of over-voltage is not good for the electrical equipment in the car, including your expensive radio!

The more modern alternators are self-exciting and generally do not need a battery for excitation, but they still need a reference to be able to regulate the charge to the battery, and this will often be the battery itself. The moral here is to use some over-voltage protection in case the battery connection fails. I am sure that you, like me, have heard some of the horror stories of great expense when the battery has become disconnected while the alternator is operating. It is not unknown for batteries to fail with an internal open circuit, with the same devastating results. The battery is operating in one of the harshest possible environments for a device of this type.

Another problem with modern alternators is the use of very fast switching diodes as the rectifiers. This reduces the heat dissipation and allows either smaller heatsinks in the alternator or a higher rating for the same size package. Unfortunately, these very fast switching devices can create a large amount of RFI because of the very rapid rise and fall times when they switch. This has been noticed particularly in diesel vehicles where ignition noise is not usually significant. It appears to be common practice in the vehicle manufacturing industry to give little or no consideration to the electromagnetic compatibility problems that may result from economic considerations until they are threatened with financial loss or severe safety problems.

When looking for that noise, or why the vehicle is affected by an RF source, don't forget those little tricks that the manufacturers try just to make things hard for you. These are things like panels not electrically bonded to the rest of the body so leaving a great big "hole" for RF to get through. And what about those non-metal panels? I heard the story of one amateur who mounted an antenna on an outer panel of a modern vehicle and found that he could not get a good "earth". He decided to scrape some of the protective coating away to get a good connection and, after scraping for some time, realised that he had gone further than the coating and that the panel was not metal. Remember, when working on a vehicle electrical system, **always** safety **first.** If you are going to disconnect the battery, remove the connection to the **body** before any other. If the battery is disconnected, do **not** run the alternator, it can generate very high voltages. The ignition systems can have voltages that are lethal, on both the primary (up to 400V) and secondary (up to 30-40kV) sides, so take care around them.

In spite of all this, it's a wonder that radios work in cars at all, isn't it? And it's a wonder that the vehicle's electronics don't collapse in the vicinity of a toy hand-held. So, good luck and happy mobiling! **ar**

Anti Gulf War Packet Radio Message

The United States Federal Communications has fined three radio amateurs and warned eight others for violating regulations which prohibit the transmitting of commercial messages. The FCC took the action after a complaint about a packet radio message which appeared on numerous bulletin boards.

The message urged radio amateurs to call a telephone number sponsored by the National Coalition to Stop US Intervention in the Middle East, based in New York, and to register opposition to the war. Each call to the phone number results in a $10 charge on the caller's phone bill — with $5 going to the Coalition. The message spread throughout the packet radio system and was eventually read by a radio amateur who was a Captain in the US Navy. He promptly complained to the FCC.

No one has admitted to sending the original message, and the Coalition had denied knowledge of how the message appeared on the amateur radio packet system. A radio amateur in Pennsylvania, whose callsign was on the originating message, claims his call was pirated. But the FCC has still imposed a $300 fine and warned him in an official letter that his amateur licence would be withdrawn if he continued to violate the regulations.

The incident had sparked debate in the US that the FCC could stifle the new packet radio technology by asking its users to read every message before their own station relays or places it on a BBS. American Radio Relay League executive vice president, Dave Sumner K1ZZ, says if such a move happened it would destroy the function of the packet radio network system.

In Australia a voluntary Code of Ethics has been adopted by many BBS operators with certain types of messages being filtered out of the system. **ar**

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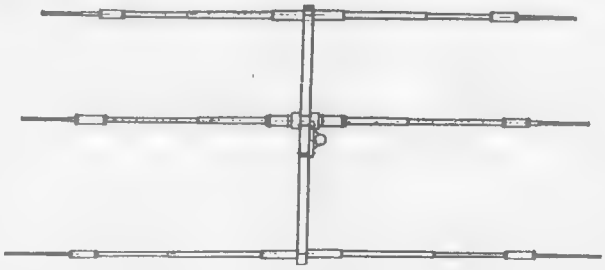

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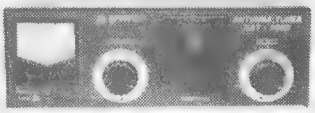

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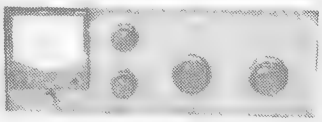

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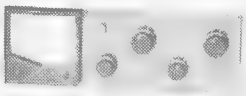

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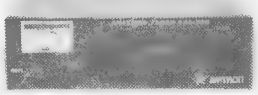

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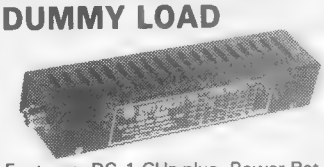

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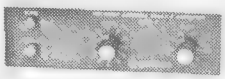

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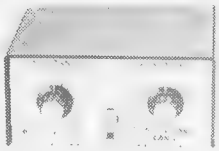

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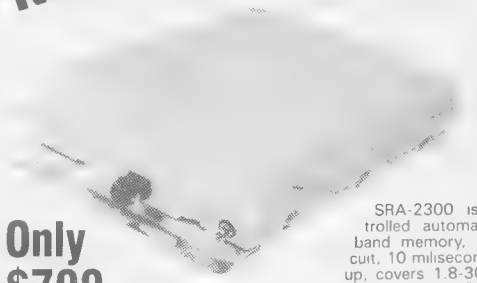

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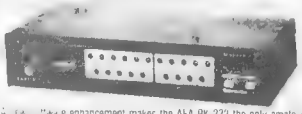

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FETs as RF Amplifiers

MIKE MURPHY VK6KRO
11 KYLIE ST, WEMBLEY DOWNS 6019

TWENTY-FIVE YEARS AFTER their introduction, it would be fair to say that FETs are rarely used by radio amateurs except as VHF preamplifiers.

This is unfortunate, as they offer many advantages when used properly.

Why aren't they being used properly now? Well, this is due to a generally held belief that they are fragile and easily blown up, and to a belief that they are like valves and can be used in valve circuits.

Modern FETs are very rugged, especially if they are used in circuits that provide an easy path to ground from their gates. This means that circuits which have just a coil from gate to ground are preferable to ones that use 10Mohm resistors. I have never blown up a FET and I have used dozens of them.

The belief about FETs being like valves was never true. You can put them in valve circuits but they won't work.

If you put a FET into a typical valve IF amplifier circuit, it will oscillate. This is why you don't see many articles about people doing this, despite the number of old valve receivers lying around.

Why is this?

If you ever tried to build amplifiers using valves like the 6AC7 or 6EJ7 you will know what fierce little beasts they were. This is because they had a high gm and enough plate to grid capacitance to make them unstable.

FETs have gms of up to 30mA/volt (much higher than almost any valve) but more drain to gate capacity than most triodes.

This would make them just about useless except for one thing: they have a **low output impedance.**

If they are used with a low impedance load they are quite stable. This is because the FET itself is being used in a low gain configuration.

So, What Good is Low Gain?

The secret is that if the FET can turn a high impedance to a low impedance, then tuned circuits can provide most of the gain needed.

If you look at figure 1, you will see that this circuit (a perfectly practical preamp for 21MHz) has a 330 ohm resistor as a load and hence has a gain of about three

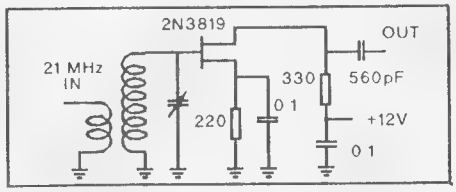


Fig 1 Pre-amplifier

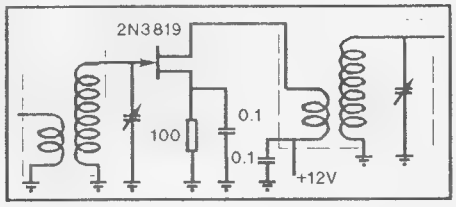


Fig 2 IF Amplifier – RF stages are identical to this

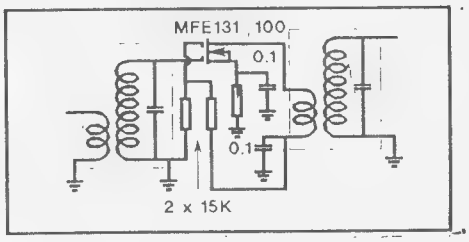


Fig 2D Dual Gate FET IF amplifier

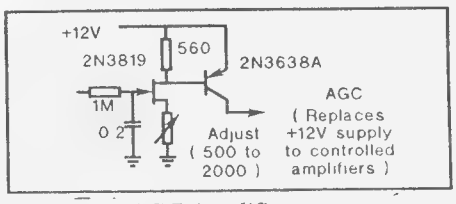


Fig 3 FET AGC Amplifier

(the FET has a gm of 10mA/v).

This would not be worth building by itself, but note that there is a step-up transformer in the tuned input. This is unloaded due to the high input impedance of the FET so it provides an extra gain of about seven.

A voltage gain of 21 is thus achieved without the FET getting a chance to oscillate. This is 26dB or over four S-points.

I use this amplifier on 21MHz and can claim a big improvement in receiver performance for weak signals. The S-meter certainly shows the difference, too. No more "Q5 but no meter movement" reports.

Another example. If you look at figure 2 you will see the idea. Normal transistor radio IF coils are used **backwards** and driven from what is normally the secondary.

The transformers thus provide a step-up in voltage and most of the gain of the amplifier.

The FET is basically there to provide an impedance change. This is power gain, of course, and I don't mean to belittle it.

I built a 455kHz amplifier using MFE131s and IF transformers from Dick Smith's (the white-cored ones in the packs) and, without any special tuning, got a gain of 10000. This was using only two stages and it was absolutely stable. A gain of 10000 will turn 10 microvolts into 0.1 volt! This is most of the gain needed for a receiver.

I have a receiver which uses **three** of these stages (to make up for a lossy filter) and it is completely stable.

Construction of such amplifiers is not difficult. Normal VHF techniques of mounting all components close to a continuous copper or brass plate and bypassing to the nearest point on it are used. Straight-line signal paths are always a good idea, too; ie don't bring an output back near an input.

I always build this way, so I don't know what would happen if you did it some other way.

What about RF Stages and Mixers?

Well, it is just the same circuit repeated over and over. Step-up transformer in and out.

The mixer is usually a dual-gate FET, so the oscillator can be injected easily. Basically, the variations are just to cope with the frequencies used.

RF coils generally have a 1:5 step-up ratio. The secondary (the larger winding) is resonated at the frequency required using a variable capacitor.

What about Automatic Gain Control?

This is actually the best bit. I tried everything I could think of before I realised how easy it is.

FETs work well at 12 volts, but poorly at lower voltages. The funny thing is that "poorly" just means lost gain, **not** distortion.

I did lots of experiments on this and

continued on page 30

A Piece of Wire

ROBERT R MCGREGOR VK3XZ
2 WILTSHIRE DRIVE, SOMERVILLE 3912

ROBERT MCGREGOR IS A champion of famous pioneer physicist and mathematician Clerk Maxwell and an advocate of the sometimes neglected Marconi antenna. Maybe his views can spark a new line of thought on your choice of radiator. He also outlines construction of a potentially useful RF current probe.

Clerk Maxwell's mathematics and knowledge of electricity were excellent. When approached on the matter of the failure of electric signalling over long distances he solved the problem with the addition of loading coils and, as a result, telegraphy spread in many countries. Could he solve a similar problem and make the construction of an Atlantic cable possible? He did, continuously loading the wire with a magnetic tape. Shortly after, another undersea cable reached Darwin where, linked up with the Overland Telegraph, Australia moved from 90 days to 90 minutes from the rest of the world. DC was fine, but what about a varying current? Maxwell's mathematics were equal to the task, and (in 1865) they did reveal one strange thing: if you have a varying electric field acting in the same space as a varying magnetic field at right angles to it, a new component, with both fields, was generated in a direction at a right angle to the other two **and was radiated!** He called this electro-magnetic radiation. Hertz demonstrated it practically (1888); Marconi showed its commercial possibilities; and amateurs made it their hobby.

Wire is very flexible and easily bent. However, the fact remains that you get maximum radiation from it if you keep it straight. You can, of course, change direction where there is no current (a current null). This has produced a multitude of antenna designs for special purposes, or maybe no purpose at all but to satisfy the inventor! You can, by terminating a wire that is horizontal and parallel to the earth, set the conditions for a steady current flow. Yes, Beverage came up with this design and it is used on VLF — a couple of miles long and uni-directional! Half the power is radiated and half dissipated in the terminating resistor. Terminated Rhombics and "V" antennas are in this category.

Amateurs usually employ a mix of a Marconi vertical antenna worked "against earth" or Hertzian dipoles, which can be in any position relative to the earth. Whether a Marconi is half a Hertz or a Hertz is two Marconis back to back is a fine subject for a chat session, but it is worth a thought about that piece of wire that performs the "magic" of radiation.

It is easiest to start, as Marconi did, with a short length of wire working against earth. We do tend to sheer off this concept — the problem of the earth, you know — and then go out with HF mobile! However, land, marine, air and broadcast services all use versions of the Marconi.

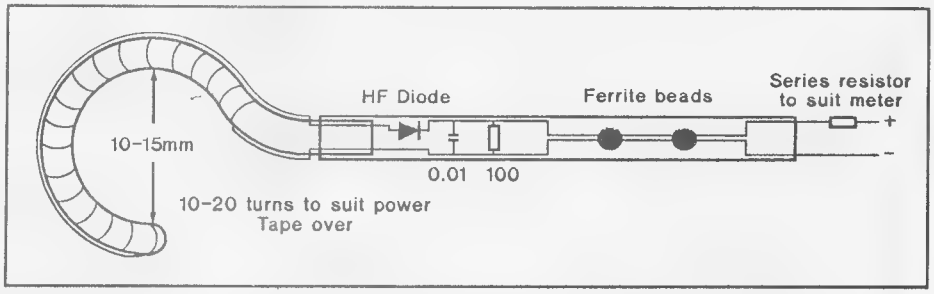


Fig 1. RF current probe
A fishing rod makes a convenient extension. Thread the twisted meter leads and, at the handle, make six to 10 turns around it to form an RF choke before connecting the meter.

Somewhere above 2MHz, where amateurs were consigned, the physical dimensions of a Hertz became "compatible" with a house block and we were hooked. The credit for the discovery of HF DX sort of washed off on to the Hertz when, in fact, the superior low angle radiation of a Marconi is better for DX! This was "rediscovered" with the ground-plane.

At present there is a widespread tendency to keep our antennas at a distance on a piece of coax — I wonder if this has reduced our relationship with the only **essential** part of our station. Everything else is an auxiliary; the prime one being the source of RF energy. Okay, energy sources do leak and radiate to everyone's sorrow.

Let's rediscover our antenna basics — 20ft or 6m of height is sufficient; I used 30ft on 160 and still worked four states on 2 watts! The support is preferably non-conducting to prevent confusion of both the signal and the experimenter. Pipe, as a top section, on a post is okay, but requires a substantial mount. A bush fishing pole, bamboo or fibreglass (F/G) rod have all worked well. The F/G rod has the advantage that you can wind coils directly onto it with minimal loss. One such, with three spaced coils, was very effective for marine use from 2.5 to 6.5MHz.

Now you can make that textbook stuff come to life and experience a "hands on" feel for our hobby. Instrumentation can be expensive, but what is ham radio but a licence to do it a bit more simply! Basically you need an RF current probe to detect what cannot be seen. A handy tool in this regard is an RF current transformer, diode, capacitor and DC meter on a suitable mounting. The secondary of the current transformer is a small air core toroid mounted on an insulating rod. It has an opening for a "wire" to be inserted, this becomes the transformer primary, to have its current checked. A dozen turns on a pencil is a good starting point, with a diode and capacitor to suit the frequency in use. You control the meter sensitivity with a shunt, but if the signal is too great, add series resistance between the shunt and the meter. If you are extending the DC leads from the diode along the rod/handle to a distant meter, then a couple of ferrite beads will reduce hand capacity effects on your measurements.

Fig 1 Basic circuit

This unit can be used to check an antenna current pattern, open wire lines for standing waves and is suitable for checking the sheath of a coax line for currents fed back from the antenna. A few turns of the coax feeder through a ferrite toroid or around a rod, at the aerial, will usually cure these "stray

Continued on page 30

220 Volt Devices

BILL TOUSSAINT VK6LT
9 DESFORD CLOSE, SHELLEY 6155

IT IS ALWAYS A NICE FEELING to get a bargain. I remember the valve tape recorder I bought in Hong Kong in the early 1960s. It was clearly marked "220 volts". I knew the West Australian voltage was 250 volts at the time, but when I pointed this out to the salesman he replied that he "could guarantee it would work on the West Australian current".

The two-pin plug connecting the recorder had parallel pins. This was easily overcome, he said, "by bending the pins with a pair of pliers so that they would fit the Australian outlets".

To some extent he was right. The recorder DID run on the 250 volts and his trick of bending the two-pin plug to fit Australian outlets appeared feasible. Despite it running a little warm, I generally had good use out of it.

With the benefit of hindsight, increased age and a little more knowledge about electronics, it is timely to reflect on the wisdom in buying such "bargains" overseas.

Even though there is now a policy in Western Australia to reduce the nominal supply voltage from 250 volts to the 240 volts used in other states, it is still not advisable to run 220 volt equipment even on 240 volts.

For the 220 volt tape recorder (or other 220 volt devices) some people have advocated + or - 10 per cent of this voltage as a rough rule of thumb for the "correct" operating voltage. On the basis of 220 volt devices, this represents a range of 198 to 242 volts. At first glance this seems to suggest that the nominal 240 volt supply will be just within this range. Or will it?

The supply voltage of 240 volts is only a nominal voltage and, depending where you are located with respect to the electrical reticulation feeder, could be higher or lower than 240 volts. This means that the 220 volt equipment will be running warmer than it perhaps should be, with a reduced reserve in the event that the supply voltage increases. The net effect will be to put the equipment at risk and to perhaps shorten the operating life of some of the components.

The "bending of the two-pin plug to fit Australian outlets" is not only undesirable, but also unlawful. With this modification it is almost impossible for the plug to fit neatly into the outlet without exposing some of the metal of the pins. This provides the potential (no pun intended) for small fingers to touch the live metal pins. There is also the two-to-one gamble that switching could be on the neutral line, if this were not checked beforehand.

Another 220 volt device which I recently came across was an adapter for people who travel a lot between countries having different voltages and who use 100-115 volt equipment (electric shavers, for example). The concept is good. No matter where the user travels, if the adapter is used, it automatically changes the voltage to suit the 100-115 volt appliance.

The one I saw was rated at 150 VA and had a variety of plugs and connectors. It could, therefore, fit the various outlets encountered in different parts of the world. A diagram of the circuitry used is shown in figure 1.

If the input were plugged into a 220V AC supply, there would be sufficient current through L1 to activate the relay and cause the supply voltage to be switched to the 220V tap of the auto-transformer. This would result in a 100V AC output from the 100V tap.

On the other hand, if the input were plugged into a 120V AC supply, there would be insufficient current flowing through L1 of the relay to activate it. The supply voltage would thus be switched to the 120V tap of the auto-transformer, giving rise to an output voltage of 100V AC from the 100V tap of the transformer.

Thus, irrespective of whether the input were 220V AC or 120V AC, the output voltage would still be 100V AC.

The concept is good, but is it really safe for the operator and the equipment? What would happen with a 250V AC instead of 220V AC input? What if the neutral and active are swapped due to the use of parallel pin plugs? What about that instant when the unit is first switched on when connected to a 220V AC (or 250V AC) supply while connected to a 100V device left switched on? What is going to happen when it is connected to a 600W iron?

With some of these questions (and answers!) in mind, the "bargains" one gets may not necessarily be a bargain, particularly if it damages your valuable 100V stereo system that you also bought overseas but wish to use in Australia! In addition, as well as not complying with Australian standards (and hence being illegal), some equipment may compromise safety.

The take-home message is that it is often necessary to check some of the electrical equipment that is available overseas, preferably before buying it. The checking should include the studying of the circuit diagram (if available) and the checking on the equipment's compliance with Australian standards. AR

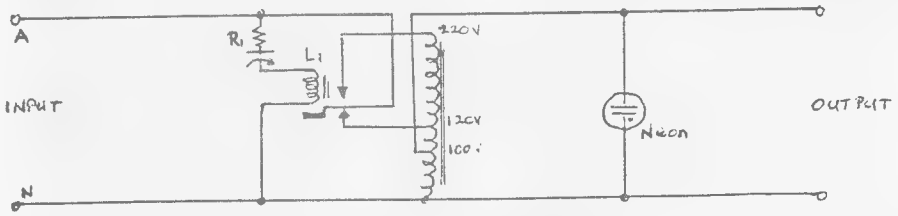


Figure 1: Circuit of the 220 V/100 V adaptor

Stolen Equipment

Tuesday 3 April the Lower Eyre Peninsula Amateur Radio Club was broken into. Removed from the radio shack were: Kenwood TS520SE HF transceiver, s/no 8650; Kenwood TR7200G 2m transceiver, s/no 111048; Kenwood 309VFO to suit TR7200G, s/no 440168; Philips FM828 VHF transceiver/channel 147.575 Pac Comm TNC tiny 2 and manual, s/no T5359; Commodore 64 computer (new); Commodore 1541 II disk drive (new). Both the computer and disk drive were engraved with the initials of the club, LEPARC in bold letters. Contact LEPARC, PO Box 937, Port Lincoln 5606.

The Horizontal Loop

(The best kept secret in amateur radio circles!)

JOE ELLIS VK4AGL
BURNSIDE RD, NAMBOUR 4560

IN 1990 I WAS LUCKY ENOUGH to make it to the Dayton Amateur Radio Convention in Ohio USA. Whilst there I picked up a copy of the *ARRL Amateur Radio Handbook,* 1990 edition, and browsed through it during a long and dreary flight back across the Pacific to Australia. I finally came across the chapter, "Antenna Projects", and noticed glowing reports on the use of full wavelength horizontal loops; indeed the author said that they were "the best kept secret in amateur radio circles".

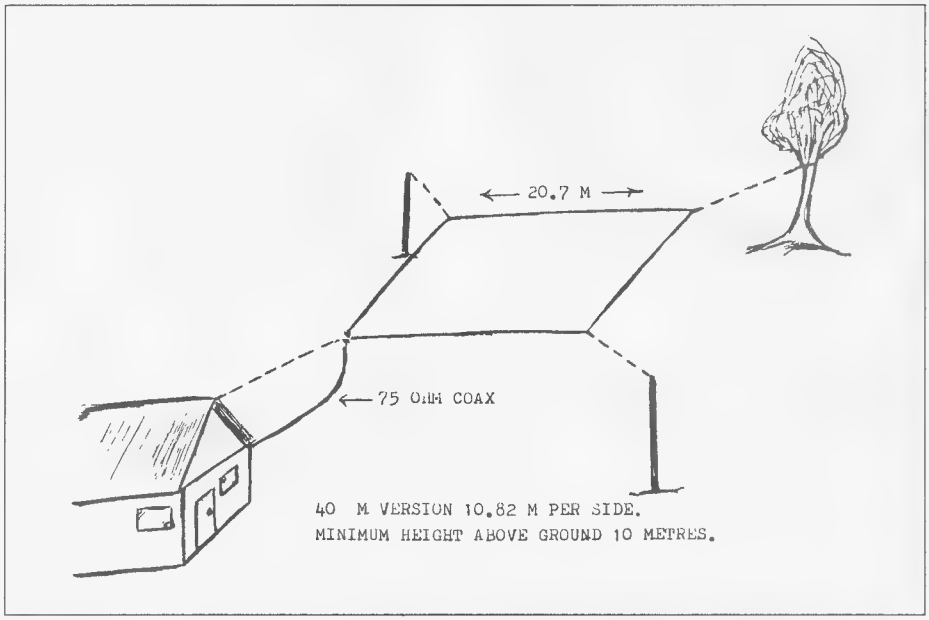
It reminded me that I had a collection of articles and correspondence on this type of antenna, gathered over a long period from contacts in the United States and Europe. There and then, crammed amongst 400 other unfortunate travellers enduring what passes for air transportation these days, I resolved to make it a project for the year.

The first reference to the use of these loops came to my attention from an article in *73* magazine, June 1978 issue. A German amateur DL3ISA took 83 metres of antenna wire and mounted it in the form of a big quad about 10 metres above the ground in a horizontal position. Each leg was 20.7 metres in length, and he fed it with 75ohm cable of random length from one of the corners, as shown in the accompanying diagram. He noted that the preferred propagation occurs off the extensions of the quad's diagonals.

In 1985 Dave Fischer W0MHS reported in the November issue of *QST* that he had used this type of antenna since 1957 in many locations and that it was a "magnetic" version of the old super Skybuster, the open-wire, centre-fed, "electric" Zepp that had performed so well for decades. Subsequently, Curt Wilson W0KKQ wrote in *World Radio,* September 1986 issue, under the heading "A Closer Look at Horizontal Loops", some interesting comments about the "re-discovery" of this super antenna which had been there all along. So much for the background.

Construction

The erection of a loop at my own property proved to be easier said than done. A Rhombic was already in use but although I was prepared to dismantle it, the diamond configuration of the poles did not allow a quad shape without an extremely long feed-line. So, the first opportunity I had of personal experience with the loop came when a mate, Tony VK4AJB advised that he had bought a few acres of land east of the city of Gympie and wanted some ideas about a suitable all-band antenna. I sent him the paperwork and arranged a weekend visit to assist.We finished the job late on the Saturday afternoon, after an expert bow and arrow performance by VK4AJB, shooting fishing line up over the selected gum trees and drawing up the necessary ropes to hoist this secret weapon. It was the middle of the Queensland winter and the sun was already low in the western sky when we adjourned into the "carashack", an old caravan used as our headquarters. As I sipped s Scotch, I reflected that I would probably cop a lot of stick if this thing didn't work as I had promised.



The auto-tune facility on the Kenwood TS440 resonated the 80m band followed by 40, 30, 20, 12 and the 10m band. It refused point blank to have anything to do with the WARC 18MHz allocation. Our first contacts were on 20 metres, and each station called responded promptly with reports of S6 or better. We spoke with a number of DL stations and checked in on the South American DX net. Transferring our operations lower in frequency we had good reports on 40 and 80m and, as the evening wore on, it became clear that this was a good all-band antenna and a pleasure to use. We had a brief QSO with one of the northern NSW stations on 160m, and finally plugged the antenna into the 2m mobile FM transceiver and raised the Sunshine Coast Repeater System some 40 miles to the south.

Subsequent weekends have proved the value of the horizontal loop as a cheap, easy-to-erect all-band antenna. We have since experimented with a full wave loop for 160m, but results have been inconclusive at this stage. Also, we made a trip to the Gold Coast and put up a 40m loop for Colin VK4AGH, who has been more than happy with the results. This antenna at 35 feet per side might appeal to those who are short of space. The formula for these loops is given as 306 divided by the frequency in MHz, or, for the oldtimers, 1005 over F, giving the answer in feet. Be prepared to cut off a couple of metres due to these formulae being for loops over clear earth. Thwarted at putting up a large quad loop at my own location, I have erected a horizontal delta loop 81m in circumference and fed via a 4x1 balun and 50ohm coax. It is too early to really comment on this configuration but it listens quite well and operates on all amateur bands. However, this shape might suit other operators as only three masts are required. Since the performance of a loop depends partly on the total enclosed area, then obviously we cannot expect the delta shape to be as good as the quad referred to in the original articles. **ar**

Television in 1932

LLOYD BUTLER VK5BR
18 OTTAWA AVE
PANORAMA 5041

TODAY WE ACCEPT OUR high-quality television, beamed by satellite all around the world, as a fact of life. The technology is not really all that old, and I thought it would be of interest to reproduce the following article taken from the February 1932 issue of Key Klix, the official organ of the historic Blackwood Radio Club. The article describes television as seen at that time by club member Harry Wheeler VK5HW.

The last paragraph is quite interesting in which Harry made reference to potential experimentation by the radio amateur. As history has unfolded, I think our ATV experimenters have well accounted for themselves, particularly those who in earlier years built their own TV equipment from bolts and nuts upward.

Television

by H W Wheeler

There has been much talk of television lately. This subject appeals to many radio experimenters, for the idea of transmitting and receiving moving pictures is certainly fascinating. However, there seems to be some doubt as to whether television at the present time is really practicable, and whether the construction, control and expense of the apparatus required are within the means of the average experimenter. Consequently, few have actually taken up the subject.

Furthermore, it seems that many enthusiasts do not clearly understand what is meant by television; the term is apparently veiled in mystery, and can mean all sorts of wonderful things. What does the average person understand by television, and what does he think of it? Many who are asked this question will say they have read glowing reports on it, that it is "wonderful" and that the time is coming soon when we shall be able to sit by our firesides at home and watch Test matches in England. Some people say that television is in its infancy, others say it is just around the corner, and still others declare it is an accomplished fact. Many persons, in speaking of television really mean transmission of still pictures, which is quite a different thing. Often do we hear the remark over the telephone, "Thank goodness we haven't got television on our 'phone yet." One man who was consulted on this question revealed the startling fact that many wealthy people have television discs attached to their private telephones. Another man, in giving his opinion, summed up the situation fairly well. He said that what he had heard about television was hard to believe; but then anything was possible with modern science. The general public has seen so many things accomplished that the previous generation considered impossible that it will now believe any marvellous thing provided the words "modern science" are tacked on to it.

Evidently the television situation is rather obscure, and the purpose of this article is to attempt to clear up some of the confusion in readers' minds. Is television a practical success? If by television, telephotography or transmission of still pictures is meant, then the answer is "yes". Reproduction on paper of pictures at a distance, by wire or by radio, is a definite success. It can be carried out by several difference processes: the Siemens-Karolus, Bell Telephone, Ranger and Cooley Rayfoto being amongst the methods employed. But by television we mean seeing actual events and moving pictures at a distance, and whether it is a practical success can be judged from the following brief description of its operation.

The pictures or scenes to be televised are scanned by a spot of light which runs over the whole picture at least 10 times a second. The reflected light is picked up by a group of photoelectric cells whose output is amplified and then is used to modulate the transmitter. The receiver has a neon lamp connected in the output, which is viewed through a revolving scanning disc. This disc usually has 48 holes arranged spirally, and gives a picture one-inch-square, containing 48 x 48 or 2,304 dots. The speed of the motor driving the disc must be very carefully "synchronised" with the transmitter scanning disc, so that the blinks of the neon lamp are viewed in the right spot. This is not a very fine picture, so let us see what difficulties have to be overcome in order to effect an improvement in this system.

Newspaper half-tone prints contain about 6,000 dots to the square inch, and this should be the minimum in a decent televised picture. Being content for the present with a one-inch picture, that means that the neon lamp must blink 6,000 times for each picture, and if the pictures are sent at the rate of 16 a second, there will be 96,000 impulses a second through the neon lamp. The transmitter will have to be modulated by frequencies varying from zero to 96 kilocycles and of varying amplitude. Now, if the transmitter is working on a frequency of 1,000kc (300 metres) the sidebands will extend from 274 to 332 metres. To receive this broadcast, extraordinary bandpass tuning circuits would be required, and also the audio amplifier would have to give linear response to an enormous band of frequencies, mostly abnormally high. And all this trouble gives us a picture one-inch-square the colour of a lighted cigarette end, and which requires superhuman skill to hold in synchronism. Also, the broadcast can be received only at short distances where it has good strength and there is no selective fading. To obtain a similar picture 10 inches square, the apparatus would have to be capable of handling nearly 10 million impulses a second, and an oscillator to be effectively modulated by such frequencies would have to work on waves below one metre. Needless to say it is impossible in practice to obtain the conditions required for good scanning. Scanning discs, although interesting and worthwhile to the experimenter whose chief delight is in his experiments and not in artistic results, will never be a thorough success. When television ultimately does become a success, some entirely different principle will be its basis.

The publicity given to television development has unfortunately been out of proportion to the results achieved. Actual progress has been slow, and probably in the wrong direction, but the publicity has gone ahead in leaps and bounds. The heads of the television concerns know that when radiovision becomes a success there will be an enormous rush to buy sets, and they are anxious to be in early and amass some wealth. Technical problems are subordinated to the problem of how to get rich quickest. Television has been thrust prematurely into the limelight, and to rouse public enthusiasm many misleading and exaggerated re-

continued on page 30

Amateur Radio In Hungary Today

STEPHEN PALL VK2PS
PO BOX 93, DURAL 2158

The year was 1938. The place: somewhere in mid-eastern Europe, in Transylvania, the region which was, and still is, in the international news today.

My friend Alex and I were trying to tune a homebrew Hartley oscillator and a Marconi antenna. After many hours of experimentation, the faint glow of a small bulb indicated that the circuit was resonant. Little we knew at that time that amateur radio would bind us into a long-lasting friendship which even today manifests itself in regular CW skeds. Both Alex and I have changed prefixes, but the love of amateur radio still binds us together over the vast distances in our chosen new homelands, HA and VK.

A little time ago Alex wrote me a long letter in which he described the changes which have taken place in the Hungarian amateur radio scene. I want to share his letter with us all.

"As you well know," writes Alex, "the technical sports in Hungary, like motor sports, private or sports flying, gliding, modelling, target-shooting, sailing, sea-diving and amateur radio were directed and controlled by a Soviet-style Defence Association, which association was part and parcel of the Ministry of Defence. The leaders of the various sub-organisations were pensioned former army officers, and the main object of the whole movement was the pre-military training of the youth in the spirit and dogma of communism.

"Amateur radio as such was a secondary issue. This control system had only one positive advantage: enormous amounts of government money were spent on city and country radio clubs, in establishment, equipment and maintenance costs, including wages for paid administrators.

"When the former communist party secretary and "boss" of Hungary, Janos Kadar, started to liberalise the life of the Hungarians, the ranks of radio amateurs increased considerably due to the existence of well-equipped radio amateur clubs. However, at the same time there were a strict selection criteria which determined who can become a radio amateur. Between the years of 1945 and 1955 only army officers, policemen and senior party apparatchiki could become radio amateurs. After 1956 (the Hungarian revolution) anybody had the opportunity, provided he or she had an "acceptable" political past. If one had relatives living abroad, or if one's father was a former (before 1945) army officer or a former "important" public servant, you had no chance of a future radio amateur life," writes Alex.

When the communist system finally collapsed at the end of 1989, "we immediately established a new independent Hungarian Radio Amateur Society (MRASZ)," writes Alex. "We had elections in each county (Hungary has 19 administrative counties, and five cities with independent status). Regional leaders and delegates were sent to the "founding" general meeting from all over the country and, in December 1989, the new national committee members were elected. It has to be mentioned that the "old" MRASZ was only a phantom organisation directed by the state and the infamous Defence Association. The old society nominated its leaders, there were no members, there was no yearly budget, and its only role was to represent the Hungarian radio amateurs at the IARU organisation, because the soldiers, the real leaders, were not permitted to have physical contact with the "western foreigners".

"The new society has no connection whatsoever with the Defence Association, which itself was to be dissolved in September 1990. Ninety per cent of the new leadership has an electro-technical background. There was a move by a small dissident group to form an "opposition" movement with the view of "rescuing" the considerable assets of the clubs into a new centralist body. The radio clubs were immediately advised to have themselves incorporated as independent bodies and claim the club assets and equipment as the legal "heirs". This advice was very much supported by two members of the Hungarian Parliament, who are radio amateurs. As a result, the assets were passed over to the individual clubs as a gift from the Defence Department.

"Starting is very difficult for a new amateur radio society. There is no more government monetary assistance, only annual membership fees. The first six months of the new society were spent in membership recruitment. To become a radio amateur is now part of the right of the citizen. There is no compulsory membership as a prerequisite, and there are quite a number of amateurs who did not join the society. Those are the free-loaders *(Familiar scene? Ed)*. The new society is now accredited by the respective branch of the Post Office as the official representative body of Hungarian radio amateurs and also by the Region I of IARU (International Amateur Radio Union). There are, of course, a few amateurs who want to establish new opposition groups; they criticise the present leadership, but they are unwilling to contribute with their voluntary work for the common good of the amateur radio community.

"There is a radio-electronic magazine called *Radio Technika* where the amateur news appears in a separate section, unfortunately with a delay of three months, because of deadline problems. However, an internal news bulletin (the editor of which is my friend Alex HA5HR) is sent to each county sub-association. It contains the latest administrative and other amateur news, contest, local club and international news and news from IARU. This news bulletin appears in a photocopy format, only 50 copies. There is now a monthly news broadcast over three UHF repeaters, and another publication called *Klubmagazin* which has a radio amateur segment.

"There is now a very good relationship with the Austrian and German radio amateur societies," continues Alex. "There is a Hungarian QSL Bureau, a Contest Bureau, which collects, dispatches and receives contest logs for international or Hungarian contests. There is an Award Committee, and an HA DX club which has as members the best DXers, and issues its own diplomas. There is an excellent fox-hunting team with a trainer and captain. The national headquarters radio station is well under way, to go on the air with the callsign HA5NHQ. Hungary at present has 4000 licensed amateur radio stations, and a further 2000 operators who do not own their stations, but are active through the radio clubs. Mot of these come from the CB ranks, and operate on UHF bands where they don't have to pass a Morse test. (Note: Hungary is situated in the middle of Europe. It is small, covering 93,036

To page 30

JOTA — First Healesville Scout Group

Operation by Healesville Amateur Radio Group (HARG Inc)

DEREK THURGOOD VK3DD
BOX 234
YARRA GLEN 3775

AT THE INVITATION OF THE First Healesville Scout Group, HARG was to set up a station at the Scout Hall for operation during the Jamboree of the Air (JOTA) weekend 20-21 October 1990.

During the weeks preceding JOTA lists of equipment requirements were prepared and "rosters" for the weekend made up.

The weekend before JOTA a small group from HARG met at the Scout Hall to test the antennas to be used for the exercise — a three-element duoband Yagi for 10 and 15 metres (Hy-Gain 1015A), a Diamond multi-band trap vertical and various wires (inverted vee, 20m Delta loop, 80m dipole). The Yagi, which had been stored at the writer's QTH for some time, showed promise after the cobwebs were brushed off, and it was hoisted some 35 feet up on an extensible Hills TV mast. (Good signals to JA and P29 on both 15 and 10m). Some difficulty was experienced with the vertical in the position tested, although all present were confident that it would be okay for 40 and 20m with the addition of ground radials (this subsequently proved correct, with good reports in VK on 40 and 5/8 reports to West Coast US on 20m). The Delta loop was known to be okay, as it belonged to the club's resident antenna experimenter (Lyn 3DKE). Some difficulty was experienced in tuning the inverted vee, and considerable time was spent until the fault was found (who was on the roof of the Scout Hall watching uncovered wire at the feed point rubbing against the gal pipe mast? — maybe Neale 3BOS can answer this).

Despite these small hiccups we were all confident that the weekend of JOTA would go smoothly and a time was organised to meet, check equipment and set up (0830 local Saturday 20/10/90) at the Scout Hall.

The enthusiasm was somewhat dampened on Friday evening (19/10) when the heavens opened and the forecast was for a rather damp set-up period on Saturday (was it then that Graeme 3KGT lived up to his callsign "Cagey-T" and un-volunteered for Saturday set-up?)

As it turned out, Saturday morning dawned fine and sunny in the Yarra Valley, and Derek 3DD, Lyn 3DKE, Jon 3PJD, Russell 3VSP, Ron 3TIW and Gavin set about getting gear together and hardware in the sky. No real problems, and the club's TS520S an the Hy-Gain Yagi had no trouble making first (non-JOTA) contacts with WD0CBT Larry in Coffeyville, Kansas, and VK4AAU Bob in Mackay, Queensland, at around 1000 (local) on 10 metres.

Of course, now we were set up, other club members turned up to help with the really hard work of enjoying the weekend with scores of local youngsters.

The equipment on hand (besides the antennas and the very necessary coffee) included the club rig TS520S, a TS440S (Steve 3MAS one of the Scout Group leaders). Yaesu FT707 (Lyn 3DKE), TS120S (Jon 3PJD), numerous VHF and UHF "handies" and a number of items for a static display — FT902D (Jon 3PJD), FL100 TX FR200 RX (Gavin), army-style Morse code oscillator (which the club uses for training), QSL cards (on loan from Jon 3PJD) and various items of club (and general) PR material.

Over the weekend there were some 40 or so youngsters and varying numbers of mums, dads and leaders in attendance (one mum, who doubles as a reporter for the local paper, was eventually convinced that, in order to write an accurate article she would need to spend some time "on-air". Finally Kath was put into contact with Harry VE7AIJ in Vancouver, Canada — hope you enjoyed the chat, Kath).

Whilst most of the longer contacts were with other JOTA stations within Australia, the youngsters were soon able to see that communication was quite possible all around the world. Countries contacted included Australia (VKs 1, 2, 3, 4, 6 and 6), New Zealand, South Cook Islands (ATIU), USA, USSR, West Germany, Japan, Canada and Papua New Guinea.

The youngsters were a fairly wide mix of ages and included boys and girls from Cubs, Scouts, Brownies and Guides. Not all got in front of the microphone, but of those who did, two boys stood out in their level of interest in communication and an apparent desire to learn how the radios worked (I wish they wouldn't ask so many difficult questions). I have no doubt that both these boys will be visiting our club in the near future. (Well done Travers and David).

I think everyone involved enjoyed the weekend (I know I did) and those from HARG will certainly have gained satisfaction from the exercise, both as a "radio" exercise and from the aspect of helping our local youth. Some of the Scout group stayed overnight, as did some HARG members (Derek, Lynn, Jon and Gavin). It was a little unfortunate that an ominous-looking storm front saw a rush of activity to dismantle the station at about 1400 (local) on Sunday, but it at least enabled those who had operated all weekend the opportunity for a hot shower and early night.

To those involved from the Scout group — thanks for the opportunity and the hospitality — hope to see you again next year. To those in HARG who participated - thanks. **ar**

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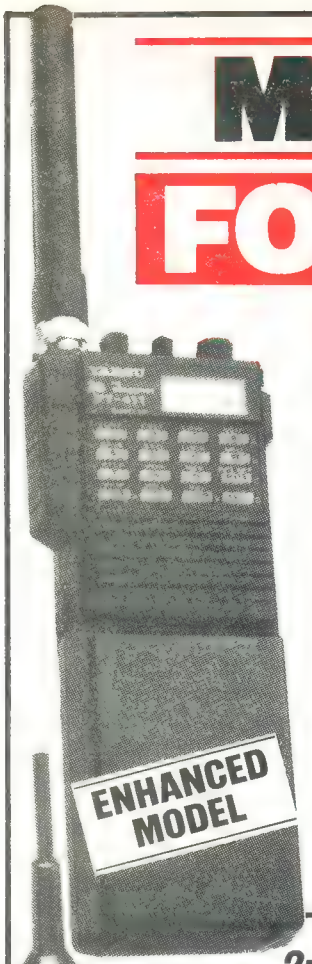

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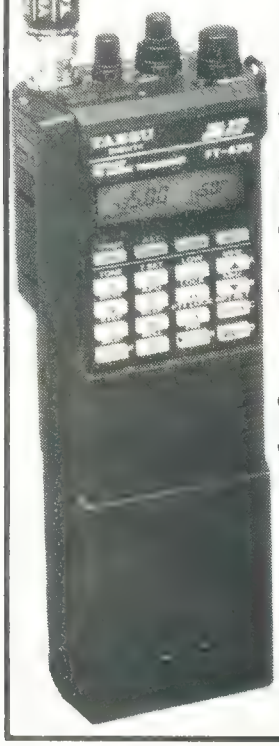

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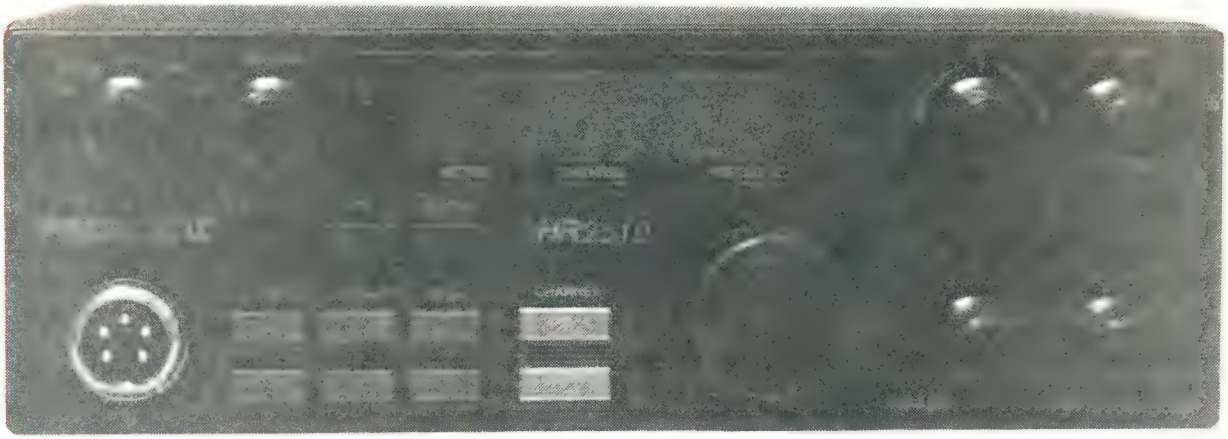

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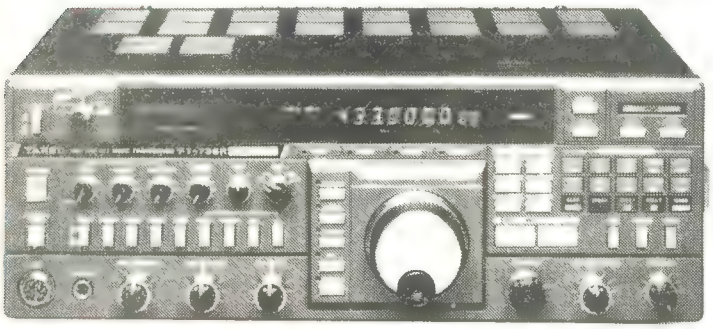

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FET's as RF Amplifier continued from page 19

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This is a bit like Plate Modulation as used in the old AM rigs.

The FET in figure 3 is biased more negatively by AGC derived from the amplified signal. The FET is effectively a base resistor for the PNP transistor. As the FET conducts less, the transistor does too, reducing the supply voltage. Note that the transistor carries the supply current for all stages controlled.

Oscillators and mixers, of course, must be fed from a stable power supply and not from the one which is controlled from the AGC voltage.

I hope other experimenters will come up with alternative AGC amplifiers. This one needs to be pruned to suit individual FETs in the AGC amplifier. Op-Amps can do it better and more predictably.

I have published this one to illustrate the principle rather than pursue perfection in this particular circuit.

I started the experiment for this article about 15 years ago, so I felt it was time to share it.

When you can build receivers that work properly, they become lots of fun.

If there is significant interest (ie, letters to the author) I might publish some specific circuits for complete receivers.

Hopefully a few old valve receivers might see DX signals again. **ar**

A Piece of Wire continued from page 20

currents", but be careful: it could be the low angle radiation from the vertical coax sheath that is working your DX!

When shorter than a quarter-wave the Marconi requires series L to resonate it. Variable inductors are hard to come by, but you can over-compensate with a fixed L and then adjust the total reactance to zero with a series capacitor. An old B/C gang is fine, but remember, both sides of this capacitor will be "hot", so use an insulated mounting and shaft. You can now consider what total load resistance you have (radiation + coil + earth_ and adjust it to the value that correctly loads your transmitter with a pi coupler, LC network or RF transformer. Alternatively, you can, by using a quarter-wave + of wire and cutting the length, arrive at a total of 50 ohms + inductive reactance. Then tune out the reactance with a capacitor in series and connect directly to the transmitter. The final length will be affected by the earth resistance, and on how dependent your output stage is on an exact 50 ohm load.

If you have a loading coil/s as part of the aerial, measure or calculate the length of wire used and add it for your total estimate of length in respect to a quarter-wave.

When they called electromagnetic radiation "wireless" it was an inversion of reality! A Wire is essential for radiation. Tailor it for your convenience.

ar

Television in 1932 continued from page 23

ports have been published, and the public has been deceived by the sophistry of the publicity agents. The newspapers are never hesitant about publishing anything scientifically sensational, and give us scraps of information about "infra-red televisors", natural colour television and the like. The principle of the latter is the use of gases in place of neon in the receiver lamp system, which would glow in the three primary colours, but it is doubtful whether such a scheme has ever been tried. A few weeks ago a report was published in an Adelaide paper of some sensational television reception in a train travelling at 70 miles per hour. This is thrilling stuff to read, but more satisfactory television in a radio shack travelling at zero miles per hour.

Occasionally the public gets a glimpse of the truth. In the course of the opening ceremony at the 1931 Radio Exhibition in Adelaide, it was announced that television was not yet with us, and was not likely to make an appearance unless some radically new principle is discovered. In QST for November 1931, in the course of an article rich in metaphors, Ross Hull states, in reference to the statement that television is just around the corner: "Unhappily, many television interests have endeavoured to avoid the corner altogether. But in crossing the vacant lot they have found themselves tangled in the underbrush of unsound principles and faulty methods."

With all this confusion it is not likely that fast progress will be made. It would be a great triumph for amateur radio if groups of enthusiastic experimenters working on new lines would discover something of importance, and lead the commercial interests along the right road to genuine radiovision. It should be remembered that the amateurs taught the commercials how to carry out long-distance communication. There is no doubt that some day we will have real television, but it may be a long way off. Certainly it is a worthwhile field for research by amateurs. **ar**

Amateur Radio in Hungary Today continued from page 24

square kilometres compared with Australia's 7,683,000 square kilometres, and has a population of 10.7 million people. Longest distance from west to east is 500km, and from north to south about 250km.

"Hungary licenses many visiting foreign radio amateurs. Since two years ago, when the scheme started, about 200 to 350 licences have been issued annually to visiting foreign amateurs, especially during summer holiday time.

Most foreign amateur visitors come from Austria, Germany, Holland and the United States.

"If one wants a visitor's licence in Hungary, the following is the procedure: Apply in writing 30 days before the required licence issue date. Supply a certified original licence photocopy, with your personal details and your temporary Hungarian residential address, and you receive a visitor's licence, free of charge, valid for 30 days. Address of the office issuing the visitor's licences is as follows: Frekvencia Gazdalkodasi Intezet (Institute of Frequency Management), Budapest, Ostrom u.16, zip: H-1015, Hungary.

The phone number of the Hungarian Amateur Radio Society (MRASZ) is Budapest 112-1616. There is an answering machine where foreign amateurs can leave messages if they need assistance or information whilst they are visiting in Hungary." So ends the letter of my friend Alex.

Does the situation of the Hungarian Amateur Society sound familiar? Source of funds: membership fees only.

Membership: not compulsory, many amateurs are not members, but are freeloaders who enjoy the benefits and privileges without contributing materially or by volunteer labour to the society. But, to criticise: they are in the forefront. There is a long march ahead, both in HA and in VK. **ar**

AWARDS

PHILL HARDSTAFF VK3JFE – FEDERAL AWARDS MANAGER
PO BOX 300 SOUTHCAULFIELD VIC 3162

Z-Matches, 80 metres and nets?

Last week I finished constructing a Z-match as described by the two Rons in the March 1990 edition of this edition, and strung up a 40m dipole centre fed with 300 Ohm TV ribbon. Well, the Z-match is an amazing device; I tuned on up 80 without too many problems and had some contacts during the John Moyle Field Day and worked all states in an hour or so. With only 30 watts, I was getting 59-plus reports consistently from all over the place.

I am now a confirmed Z-match user (I used to think antenna tuners were only for people who couldn't built resonant antennas). My main aim was to get on 80 without having to put up an antenna that was very obvious as I live in a unit. I solved this by having the apex of the dipole (actually an inverted V) inside the roof and the legs extending out of the tiles near the apex and running down to the ground. The advantage of this is that all of the 300 ohm ribbon is out of the weather and the tuning of the antenna is the same whether it is raining or not.

Now that I am on 80 I hope to participate in some of the awards nets that operate on this band. If you run an award net on 80 (or any other band for that matter), or are aware of one, please drop me a line and let me know. I will publicise all award nets in this column once I have a few on paper. In the meantime, I hope to catch you on 80 soon.

Worked all Continents

It would seem that the information presented in this column in the March edition of *AR* has generated a bit of interest in this and other ARRL awards. Up until last week, I had received only a few applications for Worked all Continents (WAC), but in the past week I have received nine applications for this award. As I stated in that column, you need to be a member of the WIA before you can apply for this award (if you are a VK resident, that is). My compliments to all those who applied, for your neat applications and enclosing SASEs, which makes my job a lot easier, as an application for WAC can be quite time consuming for me to do. I have to make sure that the contacts claimed are in the mode for the requested certificate, check that the country is in fact in the claimed continent, enter all the QSO information onto the application form and double check everything before sending to the ARRL HQ. From this month onwards, I will acknowledge in this column WAC applications that have been processed.

WAC Applications Processed During March (and earlier)

Call	Type	Endorsement	Date Processed
VK4BJE	Phone		28/01/91
VK3IR	Phone		05/01/91
VK4ZJB	Phone	50MHz	28/01/91
VK4FV	Phone		24/03/91
VK5HP	CW		24/03/91
VK2GAH	Phone		24/03/91
VK3KTO	Phone		24/03/91
VK3ETM	Phone		24/03/91
VK6PY	CW		24/03/91
VK6PY	Phone		24/03/91
VK2EHF	Phone		24/03/91
VK2PIF	Phone		24/03/91

In the past it has been my belief that WAC awards would be mailed directly to the person claiming the award. However, I have just received from the IARU secretariat three certificates in one mailer addressed to me for me to mail out. I don't know if this will be standard practice from now on, as I just sent these nine off together as well.

WAVKCA

You may be asked by a DX contact some time or another what is happening with an application that they put in for WAVKCA. At the moment, for a number of reasons, I am a little behind with processing applications for WAVKCA.

The main two reasons being that I have spent a lot of time in the past two months trying to write a program to manage the DXCC side of things. This has almost come together, but I still have a lot to do. Once this is done, though, I will be able to have regular listings of updates, as these will take no longer than a few minutes to produce. The hardest part will be entering all the information. In this department I have had an offer from Peter Styles VK3EBP to key in all the data, and Bill Verral VK5WV sent me a copy of his DXCC program written in dBase III+, which I have used portions of in my own program. Of course, while all this is going on, Steve VK3OT has been looking after all the DXCC updates etc. So, as you can see, it is very much a team effort.

Now, to get back to WAVKCA, the other reason I am a little behind is that we ran out of certificates in January, and I had been shopping around for a good deal on printing new ones. As it turned out, we are going ahead with getting them printed by our usual printer. I had someone who was going to do them cheaper, but he kept putting me on hold, and I was getting too far behind. These certificates are expensive to print, because of the number of colours in them and their size. We made the decision to reduce the size a little (down to about 90 per cent of the original size with no blank border) and to print on normal paper rather than on the on the rather heavy paper they were on before. All of this will keep the cost down sufficiently so as to enable us to keep the colour. Although the certificate in its present form may look a little dated, it never fails to get the most compliments and continues to impress those who receive it. Because of this I decided not to change the design at all.

The DXCC Procedure

Due to the fact that I received a couple of nasty letters regarding the amount of time taken to process DXCC updates and new applications, I have instituted new procedures for DXCC. I should firstly point out that the delay was due to myself and nothing to do with Steve VK3OT (DXCC assistant). The following has been sent to all people waiting on updates etc.

"Thank you for your interest in the WIA DXCC program. Your application for update/DXCC has been received by myself and forwarded on to the DXCC assistant. I would like to take this opportunity to explain the new procedure for the handling of updates and new DXCC applications.

All DXCC mail is forwarded to myself (Federal Awards Manager) and all applications for DXCC and updates are recorded and then passed onto the DXCC assistant.

At this stage you will receive an acknowledgment from me that your correspondence has been received and is being acted on. Any QSL cards that you have sent are checked by myself and returned the same day they are received. This is to avoid unnecessary delays and to get your cards back to you as soon as possible.

Applications for new DXCC will be issued by myself and will take a little longer as I have to get the approval back from the DXCC assistant. Updates will be issued directly from the DXCC assistant.

I believe these new procedures will help speed things up a bit as well as putting your mind at rest. I have been very busy lately, trying to finish a program I am writing to computerise DXCC, and this will become reality within 6-8 months. When this is done, updates will be listed regularly in *AR* and new DXCCs will be easier to process.

Your understanding would be appreciated, and if you have suffered a delay in the past I assure you it will not happen again.

Awards Requiring Contacts in 1991

From Ted Melinosky (K1BV) who publishes the K1BV awards directory (see last month's column) comes information on awards that require contacts during 1991.

Estonia — Paide 700 Years Award — Contact ES3 stations from 1 Jan 1991 to 1 Jan 1995. Europeans need 10, others five. One contact per station per band. All modes. One QSO with ES3XV is required. GCR list and fee of six IRC or $US3 to: Yeryomin M Yuri,

PO Box 81, Paide, 202820 Estonia, USSR.

Indonesia — Visit Indonesia Year Award. Work/hear three of the special event stations which are celebrating Visit Indonesia Year 1991 with their 8A6 prefix. Stations planned to be active during the year: 8A6INA, 8A6NIN, 8A6VST, 8A6YER. GCR list, your own QSL SAGON and fee of four IRCs to: Awards Manager, PO Box 666, Medan 20001, Indonesia.

Spain — Barcelona Olympic Games Award. Contact EA3/EC3 stations during the period 1 September 1990 to the last day of the Olympics, 9 August 1992. All modes and bands. One award per station. Valid QSLs will be marked "Olimpiada Cultural Barcelona 92" and are worth 1 point each. Spain, Balearic, Portugal and Andorra need 70 points; Europe, Africa, Canary Islands and Azores Islands need 50 points; Asia, North and South America need 30 points; Australia/Oceania needs 10 points. Stations will use: CQ CQ Barcelona 92. Send in the numbered label of the QSL card, including their call with the serial number as listed. Award is FREE. Apply to: Radio Club Baix Penedes, Box 250-43700 El Vendrell, Tarragona, Spain. (CQ Mag)

USSR — Russian Matrioshka 100 Years Award. During the period 1 January 1990 to 31 December 1991, work at least 100 different USSR stations. Stations may be contacted only once on any band and any mode. SWL OK. GCR list and fee of 10 IRC or $US5 to: Awards Manager, PO Box 6, Makoevka, 339000 Ukraine, USSR. (TKS UA9CGL)

USSR — Town of Voizhsk 50 Years. Earn 50 points by working Voizhsk stations during the period 1 January 1989 to 31 December 1991. Each QSO with a Volzhsk station equals four points, SWL cards from this town equals one point. Note: Foreign stations need only five QSOs. Special activity week during last week in May. Apply with GCR list and fee of five IRCs to: Radioclub, Box 5, Volzhsk, Mariyskaya ASSR, 425008 USSR.

Look for UZ4SWF SWQ SWU SWV UW4SA RA4SAE SBV SAP SA1 SAZ SBJ UA4SAB SAC SAI SCG SBA SBP SGA SGE SGG SGS SDR SDG SSB SBY SDL SGI. **ar**

CONTESTS

(INFORMATION PROVIDED BY THE RELEVANT CO-ORDINATORS)

Contest Calendar

May	
4-5	ARI International DX (Italian)
11-12	CQ-M DX (USSR)
25-26	CQ WW WPX CW
June	
15-16	All Asian DX Phone (JARL)
22-23	VK novice (date to be confirmed)
July	
20	Sunshine State Jack Files Memorial Contact (Rules *AR* June)
Aug	
24-25	All Asia DX CW (JARL)
17-18	RD Contest
Sept	
14-15	33rd Scandinavian (CW)
2-22	33rd Scandinavian Phone
Oct	
5-6	VK-ZL Oceania DX SSB
12-13	VK-ZL Oceania DX CW
26-27	CQ WW DX SSB
Nov	
23-24	CQ WW DX CW

The Sunshine State Jack Files Memorial Contest 1991

Objects

1. The objects of the contest are to:
   (a) perpetuate the memory of the late Jack Files, a longtime member of the Council of the Queensland Division of the Wireless Institute of Australia;
   (b) enable amateur radio operators to work Queensland stations for the Worked All Queensland Award, and other awards issued by radio clubs in Queensland;
   (c) encourage mobile/portable operation from the lesser populated towns and shires in Queensland;
   (d) provide a "warm-up run" for the Remembrance Day Contest

Period

2. The contest will be run in one time period, on Saturday 20 July 1991. The period will encompass **any six consecutive hours** between 0200 hrs UTC (1200 hours EAST), and 1359 hrs UTC (2350 hrs EAST), or part thereof, ie, six hours is the maximum operating period.

Sections

3. Stations within VK4:
   (a) Tx all band. Twenty per cent of contacts claimed must have been made on the V/UHF bands;
   (b) Tx HF phone;
   (c) Tx HF CW;
   (d) Tx V/UHF only;
   (e) Club stations in (a) to (d) above, single transmitter.
4. Stations outside VK4:
   (a) Tx all band phone;
   (b) Tx all band CW.

Preferred Contest Frequencies

Phone		CW	
1.820-1.840	MHz	1.805-1.815	MHz
3.570-3.590	MHz	3.525-3.535	MHz
7.100-7.120	MHz	7.010-7.020	MHz
14.180-14.200	MHz	14.050-14.060	MHz
21.170-21.195	MHz	21.125-21.150	MHz
28.480-28.520	MHz	28.125-28.150	MHz

Operation

5. The WARC bands may not be used in this contest. Crossband operation is permitted only via a satellite repeater; contacts made via a net are not admissible; cross-mode operation is allowed.
6. The contest is primarily for single-operator stations, but log-keepers are allowed. Where two licensees use a single station, each is to submit a separate log.
7. Club stations may use multiple operators, provided there is only one transmitter in use at any one time.
8. Home-based stations may be worked again after an elapsed time of one (1) hour.
9. Mobile or portable stations are not subject to the one-hour rule when operating from a different city/town/shire. When operating within one hour from that of previous operations, they are regarded as "new" stations for their own and the contacted station's scoring purposes. (Different is not to be taken as alternating, eg operations from area A for 50 minutes, then move area B, operate for 50 minutes and return to area A, would be regarded as alternating, not different). Operations from the same city/town/shire after one hour, regardless of movement within that area, are regarded as home station operations.

Calling Procedure

10. Phone: CQ Jack Files Contest
    CW: CQ Test Jack Files

Exchanges

11. Each exchange is to contain the following elements:
    (a) the location designator, N or S, see **scoring;**
    (b) the serial number beginning with 001 and continuing in sequence throughout the contest and on all bands worked;
    (c) the "code letters" of the designated city/town/shire as set out in the attached "designated areas and code letters".

Scoring

12. For scoring purposes, Queensland is divided into two zones by the Tropic of Capricorn. Stations in designated areas north of the Tropic are to use the letter "N" as the first element of contact exchange. Those in designated areas south of the Tropic are to use "S" similarly.

Example: A valid exchange for scoring purposes might be:

S	001	MH
Zone	Contact	City/town/shire
N	132	RH

13. Stations within VK4, phone contacts:
    (a) HF/V/U/HF within the same zone 3 points
    (b) HF/V/U/HF with the opposite zone 5 points
    (c) HF/V/U/HF outside VK4 2 points
    (d) All CW contacts score double points, ie 6, 10 or 4.

14. Stations outside VK4, **all** phone contacts, two points, **All CW** contacts, four points.

Bonus Points Applicable to all Stations

15. A bonus of ten (10) points may be claimed for the first contact with a city/town/shire, other than the one from which the claimant is operating, over the whole contest.
16. A further bonus of ten (10) points may be claimed for each club station on each occasion it is worked (one-hour rule still applies).

    Examples: Phone. A VK4 station in S zone, first contact with VK4OOO in Cairns, which is the club station of the Green Island ARC Inc ... score five points for across zone, 10 points for first contact Cairns City, 10 points for club station, total 25 points.

    CW. For the same contact, score 10, 10, 10, total 30 points.

    Stations outside VK4 would score 2, 10, 10, or 4, 10, 10, for phone or CW respectively.

    NB. No further bonus may be claimed for Cairns City.

Logs

17. Logs must show the full name, address and callsign of the operator(s), the section entered, points claimed for each contact and the total points claimed, a signed and dated statement that the rules have been followed, and the appropriate licence conditions observed. A recommended form of log is:

18. Logs are to arrive at:
    VK4 Contest Manager
    T Mulholland VK4AEM
    PO Box 35
    Caloundra City 4551
    On or **before** 16 August 1991.

Awards

19. Trophies will be awarded by the VK4 Awards Manager to the highest scorer in each section, provided that there is a minimum of five entries in that section.

Code to Define Cities, Towns and Shires for the Jack Files Contest

Cities/Towns

Brisbane	BN	Warwick	WA
Bundaberg	BU	**Shires**	
Cairns	CS	Albert	AL
Caloundra	CA	Allora	AA
Charters Towers	CT	Aramac	AC
Dalby	DY	Arakun*	AN
Gladstone	GD	Atherton	AT
Gold Coast	GC	Burdekin	BK
Goondiwindi	GI	Balonne	BL
Gympie	GY	Banana	BA
Hervey Bay	HB	Barcaldine	BC
Ipswich	IP	Barcoo	BO
Logan City	LC	Bauhinnia	BH
Mackay	MC	Beaudesert	BT
Maryborough	MB	Belyando	BY
Mount Isa	MI	Bendemere	BD
Redcliff	RC	Biggenden	BG
Rockhampton	RH	Blackall	BX
Roma	RM	Boonah	BV
Toowoomba	TO	Booringah	BQ
Townsville	TV	Boulia	BZ
Thuringowa	TH	Bowen	BW
Broadsound	BS	Mareeba	MA
Bulloo	BP	Maroochy	MO
Bungil	BI	Milmeran	ML
Burke	BR	Mirani	MN
Caboolture	CB	Miriam Vale	MV
Calliope	CL	Monto	MT
Cambooya	CM	Moreton	MR
Cardwell	CD	Mornington*	MZ
Carpentaria	CP	Mount Morgan	MM
Chinchilla	CH	Mulgrave	MG
Clifton	CF	Mundubbera	MU
Cloncurry	CY	Murgon	MY
Cook	CK	Murella	MX
Crows Nest	CN	Murweh	MH
Croydon	CR	Nanango	NN
Dalrymple	DL	Nebo	NE
Diamantina	DI	Noosa	NO
Douglas	DG	Paroo	PO
Duaringa	DU	Peak Downs	PD
Eacham	EA	Perry	PY
Eidsvold	ED	Pine Rivers	PR
Emerald	EM	Pioneer	PI
Esk	EK	Pittsowrth	PT
Etheridge	ET	Proserpine	PP
Fitzroy	FZ	Quilpie	QL
Flinders	FL	Redland	RD
Gatton	GT	Richmond	RI
Gayndah	GH	Rosalie	RO
Glengallan	GL	Rosenthal	RL
Gooboorum	GM	Sarina	SA
Herberton	HT	Stanthorpe	ST
Hinchinbrook	HK	Tambo	TB
Ilfracombe	IL	Tara	TA
Inglewood	IW	Taroom	TM
Isis	IS	Tiaro	TI
Isisford	IF	Torres	TE
Jericho	JE	Waggamba	WG
Johnstone	JO	Wambo	WO
Jondaryan	JY	Warroo	WR
Kilcoy	KY	Widgee	WE
Kilkivan	KK	Winton	WI
Kingaroy	KG	Wondai	WD
Kolan	KO	Woocoo	WC
Laidley	LA	Woongarra	WN
Livingston	LV	*Permission to operate in these shires is required.	
Longreach	LO		
McKinlay	MK		

Date	Band	Mode	Call	No	No	Points				
Time				Sent	Rec'd	QSO	C/T/S	Club	Total	
15										
7										
89										
0834	7.0MHz	Phone	VK4OOO	SO01BE	NO02CS	5	10	10	25	
0837	7.0MHZ	Phone	VK4SSS	SO02BE	SO01BE	3			3	
	(Assumes VK4SSS is not a club station)									

ar

HOW'S DX

STEPHEN PALL VK2PS
PO BOX 93 DURAL NSW 2158

I read somewhere that when the mountaineer was asked why he wanted to climb the Himalayas, his short reply was: "Because it is there!"

Maybe we DXers are in the same mould. It is a challenge. We try to climb the mountain of ever-changing DX countries to reach the present magical number of 322.

There are givers and takers in this challenging game. It is a challenge to the givers to activate a rare DX country, sometimes at their own personal physical peril, discomfort, illness and financial stress.

It is also a challenge to the takers, who go into the battle of "pile-ups" with their basic tribanders and 100 watts, day by day, night by night, to emerge sometime later with bleary eyes, shaky hands, and announce to a sympathetic, slightly puzzled partner: I worked S2! The signals were 5x9!

Bangladesh S2 — Bhutan A5

Jim VK9NS has been negotiating with the Bangladesh authorities for more than a year to go there for a DXpedition. Bangladesh has not been officially on the bands since 1981, except for a short activation last year by a Japanese group. The country is high on the list of most-wanted countries. According to the *DX* magazine, 62 per cent of its readership wants Bangladesh as a new country.

Political turmoil has interfered several times with Jim's plans. Every time the authorities were ready to give him permission to enter and grant him a licence, there was a change of government, and the whole process had to be started again. Since early February Jim was ready to go. The green light finally came on 20 March and Jim has left. Hopefully, by the time you read this, the operation would have been a success, and you would have worked him, and you can strike off S2 from your own personal list of wanted countries. At the time of writing, it is not known whether Jim was given a licence or not. However, he is in the country at the invitation of the Bangladeshi authorities.

Following Bangladesh, Jim will have a short rest. Then he will pack his bags again and leave with his wife, Kirsti VK9NL, for Thimphu, Bhutan A5, where he will arrive in the first week of May with a beam antenna and amplifier. This is the second time he has

visited this Himalayan country. Hopefully those who missed out the first time will be able to work Bhutan on this occasion. QSLs in separate envelopes with return postage go to: Jim Smith, PO Box 90, Norfolk Island 2899, South Pacific.

Norfolk Island — VK9

On 9 April, the Norfolk Island Philatelic Bureau, Norfolk Island, 2899, South Pacific, issued three stamps to the values of 43¢, $1.00 and $1.20, commemorating amateur radio. The three stamps show Norfolk Island and its global and regional location, and lists the callsigns of Norfolk's five current residential amateurs: VK9JA, VK9ND, VK9NI, VK9NL, VK9NS. Send your order for the first-day cover with your local Australian cheque for $2.85 to the above address.

Auckland and Campbell Islands — ZL9

A group of ZL and JA amateurs made a short visit to these southern islands at the beginning of March. These islands count as a separate DXCC country. The callsigns used were: ZL9DX, ZL9TPY and ZL9YL. ZL9YL was used by the lady operator forming part of the group. All QSLs go to: JH4RHF Tanaka Junichi, 1-4-6 Katobaki, Hattori, Toyanaka, Osaka 561, Japan. SAE and one green stamp, please.

Andorra — C30

A group of Swiss amateurs will be active from Andorra between 10 and 20 May, on the usual DX frequencies. Look for them on: 28495, 21295, 14195, 7085, 3795, and/or on: 28025, 21025, 14025, 7005 and 3550. QSL goes to HB9MM, the USKA Swiss Radio Club, Section Vaudois, Box 3705, CH-1002, Lausanne, Switzerland.

DX QSLing

My attention was drawn by a number of VK4 DXers to a list with the heading, "The following are countries without a QSL Bureau. There is no point in sending your QSLs to the VK4 Bureau for on forwarding to these countries. Please QSL direct." This list appeared in the VK4 WIA monthly publication, *QTC,* February 1991 issue.

After having cross-referenced both the International and the North American callbooks (1991 editions), I must come to the conclusion that the quoted list is substantially correct. Here, now, are the callsigns for which there are no QSL bureaux according to the "Callbook". Therefore, your cards cannot be forwarded directly through your own bureau.

A5, A7, C9, D2, D6, FH, FR, FW, HZ, H5, J5, KH1, KH3, KH5, KH5K, KH7, OH0, OJ0, PY0, S9, S0, TJ, TL, TP, TT, T30, T31, T32, T33, T5, VR6, VP2E, V3, V4, V5, V6, V8, XF4, XU, XV, XW, XZ, YA, ZA, ZD7, ZD8, ZD9, XK3, ZL0, 1A0, 1S, 3C, 2D2 Rotuma, 3V, 3W, 3Y, 4U1U, 3X, 4J, 5H, 5U, 5X, 7O, 7Z, 8Q, 9G, 9N, 9Q, 9U.

However, there is no guarantee that all the bureaux with addresses in the callbook are functioning. I cannot imagine, for example, that the ET bureau is working, despite the address shown in the callbook. The above list is not complete or infallible. Your comments will be appreciated. But a word of hope — all is not lost. Very often cards with prefixes from the above list can be handled c/- QSL managers via the Bureau. I never had any difficulty sending or getting a card from OH0 via the Bureau, but I always marked the QSL route on the card, both front and back. If there is no QSL route (QSL manager) shown on your card to an exotic prefix country, your bureau manager has a problem and your card is in trouble. Looking at the extensive list of DX prefixes with no bureau facilities, I want to remind all DXers to mark the QSL route. If there is a manager, send the card directly to the manager, or find out from your DX QSO partner, if there is time, whether the manager accepts cards via the bureau. (Some do, but most of them don't). Please listen in the pile-up patiently for the QSL information. If the instruction says: callbook address, send your card to that address direct. It is quite astonishing to discover that for the Colvins' Australian activity, in February 1990, with the non-exotic ordinary callsign of VK2GDD, more than 500 cards have arrived at the VK2 Bureau doorsteps, some even from the USA. The Colvins' QSL address is well known, is well published, is given out several times on each appearance (c/- Yasma in California, USA). About DX QSLing, see also my notes in March and May 1990 issues of *AR.*

Some of you will know that I have completed an extensive report on VK QSL Bureaux with certain recommendations in 1990, as requested by the federal body of the WIA. Here are now *some challenging questions to all VK outgoing-bureau managers!*
Please write me a short note and tell me:

a) What do you do with the cards sent to you by the members who do not know any better, for which there is no QSL bureau on the other end?
b) Do you return them to the sender?
c) Do you destroy them?
d) Do you give a list to the bureau members before they join up, or when they join up, about the prefixes where you are unable to forward the cards?
e) Do you tell them to put QSL routes (QSL managers) callsigns on both sides of the cards?
f) What other measures do you undertake to facilitate the forwarding of these cards to those prefixes?

These are serious questions. I am waiting now to receive your replies. Readers: please stay tuned, I will publish the replies.

Bing — VK2BCH and the South Pacific

I received a letter from "Bing" which throws an interesting light on this particular DXer who likes to do his DXpeditions in his own way and alone. Bing spent most of his life in the British and Australian Armies and, after changing "jobs", had a seven-year period as a "school sergeant major" at a well-known North Sydney private school. In 1980, he retired to Forster, NSW, a holiday spot on the east coast. He has a radio amateur background of 40 years in radio clubs in England, Palestine, Egypt, Cyprus and Malaya. He joined the WIA in 1976 and, after a brief spell as a novice, he obtained his full call in 1983.

He started travelling as a DXer in 1983. He went to Lord Howe Island as VK9LB, to South Cooks as ZK1XV, to Tokelau Islands as ZK3RVC, to Western Samoa as 5W1GY, to Tonga as A35XV, and to Fiji as 3D2XV. Lately his favourite spot is Rotuma Island as 3D2XV, where he will probably return in April this year. Bing ends his letter thus: "I use only voice on radio. I hate CW. During World War II, I fought Rommel in the desert and in Italy. I was wounded twice in action. After eight months in hospital, I ended up on D-Day in France. At times I was up to 15 hours on CW, sitting in a very noisy tank. Never again!"

We wish you good health and plenty more DXing, Bing!

Interesting QSOs and QSL Information

Note: callsign, name, frequency, mode, UTC, month of QSO.

A92FL - 21026 - CW - 2030 - March. QSL to WD4DCY Hubert W Buck Snr, Rte 1, Box 290A, New Bern, NC, 28560, USA.

VQ9TB - 21008 - CW - 0700 - March. QSL to the Manager, Box 55, PO, San Francisco, 96685, USA.

5B4FB - Gorios - 14019 - CW - 2033 - Feb. QSL to Gregorios Papadopoulus, 25A Byzantiou, Nicosia, Cyprus.

GJ0KYZ - Paul - 14004 - CW - 2022 - Feb. QSL via Bureau.

TA2AO - Osman - 14037 - CW - 2006 - Feb. QSL via Bureau.

9M8AX - Ross - 21MHz - 0951 - Jan. QSL to 9M2AX via the Bureau.

T23XX - Claus - 14MHz - 1022 - Jan. QSL to DL2GBT via the Bureau.

JW0GB - Laila (yl) - 14226 - SSB - 1120 - Feb. QSL to WB4ZBI Howard K Moll Jr, 8174 Coventry Ln, Chattanooga TN 37421, USA.

TA8C - 1422 - SSB - 0639. QSL to the Manager, PO Box 13, Gaziantep, Turkey.

VK9LM - Rudi - 10102 - CW - 1035 - Feb. QSL to DJ5CQ Rudolf Mueller, Alter Main 23, D8601, Ebing, Bamberg, Germany.

XF0C - Juan - 14222 - SSB - 0647 - March. QSL to XE1BEF Hector Espinose Flores, PO Box 231, Colima, 28000, Mexico.

T31AF - Karl - 14027 - CW - 0625 - March. QSL via Bureau to Manager DL2MDZ Rainer Kuehnberger, Friedrich Str, 10, D8662, Helmbrechts, Germany.

VR6MW - Meralda - 14335 - SSB - 0809 -

March. QSL to NZ9E David F Miller, 7462 Lawler Ave, Niles, Il, 60648, USA.

CP50RCB - Vic - 14226 - SSB - 1138 - March. QSL to the Manager, PO Box 800, Cochabamba, Bolivia.

RTTY News

Syd VK2SG has returned from his holidays in VK5. Here is the list of some of the interesting contacts.

7Q7LA - 14083 - 1755Z - QSL to G0IAS • 5V7DP - 28098 - 1129Z - QSL to KA1DE • A92FG - 14089 - 2138Z - QSL to ARAB, Box 23381, Muharrak, Bahrain • TY1PS - 21080 - 0039Z - QSL to BP06-2535, Cotonou, Benin, North Africa • 9J2BO - 28085 - 1006Z - QSL to W6ORD • 3B9FR - 28087 - 1015Z - QSL to Box 31 Rodrigues Island, via Mauritius • KG4CO - 21083Z - QSL to APO 09593, New York, USA • VP5VDV - 14088 - 0453Z - QSL to WD4JNS.

Incidentally, Syd just passed the mark of 260 countries confirmed on RRTY, which puts him in No 1 RTTY position in Australia.

From Here and There and Everywhere

Murphy's typo error raised its ugly head again. The next WARC will be in the year of 1992, and not 70 years earlier as it appears in the first paragraph of this column in the March issue of *AR*.

Additional info on "Maritime Mobile" *AR* March 1991. Arthur VK6ART (the former controller of the Traveller's Net), Ron ZL4MK and Arthur VK2AS, were the other group of VK amateurs who actively assisted both the Hungarian yachties and the BOC fleet while they were sailing in the area from Perth (VK6) to Cape Horn (CE8). For two and a half months it was a daily sked at an appointed hour.

Ken VK5QW advises that Al/Mohamed 9K2CS is active and well. I heard him and 9K2SH on 20m a few days after the liberation of Kuwait. All the DXCC cards of 9K2CS were destroyed during the short Gulf War. It is suggested that anyone who ever worked Al as 9K2CS might like to mail him a card for their previous QSO,and thus replace the cards which were lost.

The logs for 701AA were not lost, and now are in the hands of Gaby DL2BCH who has undertaken the huge task of QSLing to those who did not get a card before the Gulf War started. You have to submit a new card, and the usual self-addressed reply envelope. Please note that due to the new exchange rate between DL and W currency, one green stamp does not cover the airmail postage from Germany. Suggest you send two green stamps or two IRCs.

Picture QSL cards of 708AA have started to arrive in VK from QSL manager F6EXV.

The QSL cards for the various Pacific operations of Kiyoko should be sent direct only to the address shown in March 1991 *AR*. Kiyoko does not have a Japanese callsign, and she is not a member of the JA QSL Bureau.

Austin VK5WO reports that the Sts Peter and Paul Rock operation of the Natal DX group PY0S is still on target, possibly in the first week of May for 10 days.

Plastic everywhere! According to the DX news sheet, it is quite in order to quote your international credit card number when you apply to the ARRL for your DXCC award.

The cards of CE0ZZZ are currently being mailed by the manager CE3BFZ.

Martin VP8CEO is now back in the UK and is working his way through the 3000+ QSL cards, as is KL7W/W6 Dick, who was acting as his QSL manager for the last few weeks of his contacts. Martin is asking everybody who sent cards to him, but not yet received a reply, to be patient.

Jack ET2A, not heard from Ethiopia for eight years, appeared on a variety of frequencies during March. On 20m, only a few VKs were able to work him due to weak signal and bad propagation. However, on 21 March he had quite a good signal on 15m on short path to VK. The news is that, at the end of March, Jack goes back to USA for one month, but will be back in Ethiopia in May with a linear amplifier. See also April 1991 *AR*. Please note: the QSL manager's address given in that issue of *AR* is, unfortunately, no longer correct. Peter WB2WOW became a silent key just a week before Easter. The new QSL manager for ET2A, ST0DX and 7Z1AB is WA2NHA Howard Messing, 90 Nellis Drive, Wayne, New Jersey, 07470, USA. My understanding is that there is no need to re-QSL if your card was already on its way to Peter.

On 27 April the International Marconi Day was celebrated from quite a number of those locations which had some significance in the first radio experiments of Marconi. The UK was represented by five stations; Italy with three stations; Canada had two; the USA, Ireland and South Africa were represented by one station. All these stations had an MD IMD MDI combination of suffixes. Australia, despite pioneering some work with first transmissions from the UK, it appears, was not represented.

The Cocos-Keeling Island expedition of Peter VK3AWY was moved forward from May to March or the beginning of April. The callsign is VK9YJ.

There is quite a lot of uncertainty about the activity of a station using the callsign 4K1ZI and allegedly active from the South Sandwich Islands. Official Moscow sources know nothing about him, neither does the UK Foreign Office. The RSGB DX news sheet does not think it is a legitimate operation. Is it a pirate? Some think so, despite the fact that QSL info was given as RB4JBU, which callsign is rumoured to be not a valid one.

TW3M will be active from Molene Island (EU-65) from 4-12 May. QSL to FE1JGG.

JA5FHB is a member of the Japanese Parliament and has just been appointed as Minister for Transport and Communication in that country.

The QSL manager for Festus 9M8FH and for Loretta FM8LL, his wife, is N5FTR.

Eva PY2PE advised, on the air, that 7X5ST/3V8 is back in Algeria, but will be back in 3V8 land after mid-April, with a better antenna and a 100w transmitter.

QSLs Received

Note: W=week; M=months; Yrs=years; FM=from, MGR=manager, OP=operator.

Direct cards: V63AD (12M FM OP on his return to USA); FO0IGG (111M FM MGR),; KG4CL (10M FM MGR); T32B (10M FM MGR); JE4LWQ/JD1 (8M FM MGR); YJ0AMD (4M FM OP); V63JC (3M FM OP); T33WV (3M FM MGR); OX3SG (9M FM MGR);708AA (6M FM MGR); CE0ZZZ (15M FM MGR); 5R8GN (2M FM OP); VP8CEO (9W FM OP); VP8CEG (4M FM OP).

Thank You

This column is the result of a joint effort of many DX friends. Have you contributed to it? Many thanks for the help received from the following: VK2BCH, VK2DID, VK2QL, VK2SG, VK3DBZ, VK3DD, VK4DA, VK4CRR, VK4OH, VK5QW, VK5TL, VK5WO, VK9NS, VP8CEO, QRZ DX, *The DX Bulletin and DX News Sheet.*

If you are writing to me for individual QSL

Bing VK2BCH on ANZAC Day in his home at Forster.

addresses, please enclose a self-addressed and stamped envelope to reduce costs. Keep the information coming in.

Late News — Bangladesh

I just received the news that Jim VK9NS will be active from Bangladesh, probably just before Easter. He has to use the callsign S21U, which is the official callsign of the National Broadcasting Authority in Bangladesh. He can operate only on the following allocated frequencies: 14155, 21255, 28455, SSB, and CW on 14020, 21020, 28020. He is not allowed to use a keyer, but only a straight key. All his transmissions will be monitored by the authorities. Jim will stay in Bangladesh until 5 April. RTTY operation is not permitted.

Stop Press

The latest news again changed the above situation. Jim arrived in Bangladesh on 22 March. It took him some time to find his way out from the bureaucratic maze. After obtaining his licence, and several signatures later, he still needed the final signature of an important person before he could transmit. He came on air finally on 3 April, 12 days after his arrival in the country, and this left him only three days of operation. He was active mostly on 21255kHz, with a vertical antenna and low power. Besides a limited number of VKs and ZLs, most contacts were made with Japan and the US. His QSL address has changed — for this Bangladesh operation only — to JA1UT, Yoshi-O Hayashi, 4-20-2, Nishi-Gotanda Shinagawa, Tokyo, Japan. Better luck next time, Jim.

GOOD DX AND 73. ar

VHF/UHF AN EXPANDING WORLD

ERIC JAMIESON VK5LP
PO BOX 169 MENINGIE 5264

Six Metres

During the past month or so 50MHz has been very rewarding for those prepared to put in the time and effort to latch on to many exotic signals which have appeared. During the four months when I was laid up, so much happened it seems a pity the best of it has not been recorded in print for future reference. Therefore, I have removed the beacon list for this month to make room for extracts from the logs of some prominent operators.

Col VK5RO reports a number of openings to the USA including one well into the USA to WA85SG 449 both ways on 19/3. Col also worked NH6LT/KH6 who was running one watt on 27/3 at 0047 with signals 559! On 28/3 at 2322 V73AT and heard PJ9JT. At 0402 on 29/3 KG6UH/DU1 was worked. His QSL address is Captain Louis Anciaux, USNR, USCINCPACREP-LND, US Embassy, Manila, APO San Francisco, California, USA, 76528. Phew!

On 12/3 Col called LA9HLZ and, although a reply was received, no contact was made. Col also reports the Italian stations operate between 50.150 and 50.160 and use 50.153 as a calling frequency.

The VK5LP establishment was able to finally get back on the air after a long absence starting with 3D2PO on 9/3. JAs have been frequent visitors with a very good opening on 27/3. On 28/3 A35EM (home call JA1OEM) in Tonga was worked at 2243, followed by 3D2ER at 2303. 29/3 produced 3D2CM, and on 30/3 V73AT in the Marshall Islands at 1148.

Log Extracts

Ron VK4BRG says he has been forced to rethink his views of the ZL path as he has worked many ZL3 and ZL4 stations recently, something which has been rare in the past. His log shows 5/2/91: 2347 6W1QC Senegal and later worked by VK4ALM. 6/2: 0127 6W1QC, 0958 NI6E/KH6, 1001 WA6EMV/KH6, 1104 T20AA. 12/2: 0134 FK8FU, FK8EB, 0625 NI6E/KH6, 0631 KH6IAA, 1042 F1FHI. 14/2: 0400 JAs, 0614 NI6E/KH6, KH6IAA, 0915 PA0HIP, 0919 PA3EUI, 0922 DL0TD, DL2ZBN, DK5UG. (A side comment from Ron was that Lyn VK4ALM had the European propagation prior to him and worked about double the number of PAs and DLs plus two F stations). 17/2: 0133 to 0219 9L1US beacon. (Side comment — PY5CC worked two VS6s and 130 JAs!) 18/2: 0132 6W1QC, 0250 9L1US beacon S9. 21/2: 0648 KH6IAA. 23/2: 0112 6W1QC who said he was leaving 6W on 28/3. 24/2: 006 to 0129 — 31 W stations covering the areas of California, Arizona, Texas, New Mexico, Alabama, Georgia. Indications were that the eastern states stations were worked by Es extension. 0135 621QC worked six Brisbane stations.

Ron included a list of his countries worked and also mentioned that on many occasions foreign video was received, alerting him to possible openings to certain areas. Thanks for writing, Ron.

Steve VK3OT has sent log extracts, and his European contacts make interesting reading, especially those on 8/2/91. Most were made on CW, and from the times quoted you can see he did not waste time between contacts! Those marked * are new countries for him.

5/2: 1022 SM6CKU*, 1023 OH2TI, LA9ZU*, 1024 F2AIA, 1025 DL9CA, 1042 OH2TI, 1045 OZ7DX*, 1050 JA5CMO, 1054 SM6CKU, 1104 OH2TI, 1106 SM6DER, 1120 G3HBR. 6/2: 0155 ZL3TY, 0200 ZL3TIC. 7/2: 0940 OH2TI heard only.

8/2: 0532 JA1BK, 0913 DK3EG, 0916 DL8HCZ*, 0930 G3SDL, 0935 DK6JL, 0937 ON4PS*, 0940 PAEVI who used a vertical dipole, 0940 SM7FJE, 0941 SM7AED, 0942 OZ8RW, 0945 PA0OOS, OZ8RW, 0946 PA0HIP, 0947 SM7SCO, G3WOS, 0948 PA0FM, 0948 G3FG, OZ1ELF, 0949 GJ4ICD*, G3VFY, 0950 GW3MFY* G4MKF, 0951 G4CCZ, 0956 G3HBR, 0957 G3NVO, 0959 PA3OIC, 1000 DL9AAL, 1004 PA2HJS, 1005 ON4AMX, 1006 OZ1DJJ, 1015 SM7BAE, 1016 PA0OOS, 1024 OZ1BVW, 1025 OZ6OL, 1026 OZ8RW, 1035 SM7FJE, 1059 OH2TI, 1100 SM7FJE, 1104 DL8HCZ.

17/2: 1021 DJ2PL, 1026 G3UKU, 1046 OH2TI. 19/2: 0936 G4UPS — this contact at 16,921.6km represents the greatest distance ever worked from the British Isles and a new VK3 distance record. 20/2: 0930 9H1CG*, 0945 GJ4ICD, 1005 ZC4MK*. Thanks for the info, Steve.

Steve also advises working W4, 5, 6, 7 on 29/3 and that 6m operation has been authorised for UL, UG, UH, SV5 and SV9.

Peter VK8ZLX is the next one to send a log extract, and it is interesting to compare the dates on which European contacts took place from Alice Springs in relation to other areas of Australia; all contacts were on SSB and he too did not waste time between contacts!

7/2/91: 0935 OH2TI calling CQ on CW. 15/2; 0830 PA3ECU, 0836 PA0HIP, 0840 PE1LRG, 0844 PA3EUI, 0854 OH2TI, 0855 PA0OOS, 0859 PE1MHO, 0901 G4HBA, 0902 G6HKM, 0903 PA3FHK, SM7FJE, OZ1LO, 0904 SM7SCJ, 0905 G4UPS, DL8HCZ, 0906 SM7AED, 0907 OZ8RW, OZ3ZW, 0908 OZ1DJJ, SM7CMV, SM7JUO, 0909 PA3FHK, 0911 DJ2RE, 0912 DL6DN, 0914 PA0FM, 0915 DL0TD, 0916 OZ1BVW, 0918 DL9GU, OZ1ELF, 0924 G8DJW, DL9?R, 0929 OH2HK, 0930 OH2KT, 0933 DK5UG, OZ3ZW, 0934 G3COJ, 0936 G1GVA, ON4PS, OZ6OL, 0942 G4CCZ, 0943 G4AHN, 0945 DL2ZBN, JF4PTQ, 0946 G3UYF, 0948 DL9RM, 0949 DJ3TF, 0952 G8ADM, G3RFS, PA3EUI, 0955 F6FEF, PA3BGM, PA0LOU, 1007 PE1LCL, 1014 ON1KVL.

While at work during openings missed LX1, 26/2: 144 to 145MHz JAs with heavy distortion! 27/2: 0810 OH2TI working VK4s in Brisbane; 0932 OZ8RW, 1026 LA9ZV, 1053 GD3AHV, 1054 G3BJD. 28/2: 0914 HL2IPL.

3/3: 1009 OZ1ELF, 1010 OZ1BUW, 1012 OZ6AS, OL1DLH, 1013 OZ7IS, 1014 OZ1LIT, OZ1FDH, 1016 SM6MNS, 1017 SM6FHZ, 1018 SM6CMU, 1020 OZ4VV, 1021 DK6AS, 1023 GM2WOJ, 1024 SM6MVS, 1028 SM6PU, 1031 OZ1IPU, 1033 DJ8MT, 1035 G8GXP, 1043 PA2HJS, 1045 G4MLF, 0146 DJ3OS, 1047 G3NVO, 1048 G8ADM, 1050 F6BSJ, DL0AL, 1052 LX1JX, DJ0GA, DJ4AF, 1054 DL7AV, 1055 G3SDL, 1056 G3TCI, OE2LFA, 1058 OE5XBL, 1100 DL7ZB, OV5PAM,

OV5OLL, 1103 OV5PAM, OE5KE, 1105 OE5UAL, DL9AAK, DL4OAN, 1118 12CCD, 1119 IK2GSO, 1120 IK1EGC, 1139 JA5KTN, 1141 JA4CQS. What a night!

4/3; 0825 PA3EUI, 0830 PE1BNL, 0832 PA3DYY, 0833 PE1NOT, PA3ECU, PA1NHA, 0834 ON1AME, DK6JL, 0900 OH2TI, 0905 OH2HK, 0909 OZ8RK, 0910 SM7CMU, 0911 G4ASR, 0912 SM7FJE, OZ6OL, G4UXC, 0914 GW4EAI, JP3PJD, 0916 JP3RMX, PA0HIP, OZ1DJJ, 0917 OZ1FDH, 0918 GW6UZW, 0920 SM7AEA, DL8HCZ, 0922 G8GXP, 0923 SM7BAE, 0927 JQ3VDN, G4CVI, 0930 G4MUT, 0933 G3NSM, 0934 G2EOS, G3IBI, 0935 G3HBR, 0937 G3ZSS, 0938 G4CEZ, G4MUB, 0940 JP3TNH, 0948 SM7CMV, JH1TCA, 1000 LX1SI, 1002 PE1AED, 1005 PE1MAE, PE1NCA, 1024 F6BSJ, 1025 GI4OPH, 1027 DJ3OS, 1039 DF4IE.

5/3: 0907 JA1WZX, 1031 OH2TI, 1032 LA9ZV, 1034 OH2MNE, 1037 OK2HK, 1050 OH1AYQ. 6/3: 1052 OZ8RW, 1103 OZ33ZW. 14/3: 0737 OH2TI. 28/3: 0008 KG6UH/DU1, 2234 A35EM, FO5NK. 29/3: beacons from VS6, V73AT, ZD8VHF. 30/3: V73AT.

John VK4ZJB advises of a log with a different coverage, that of the period from October until March, and indicating his better contacts which also include some from Europe. In many cases, other Brisbane stations were also making similar contacts.

7/10/90: 0803 JD1BFI Ogasawara. 8/10: 0835 AH3C Johnston Is. 13/10: five W6s. 16/10: 9L1US long path. 19/10: KL7Y Aleutians, HL1EIZ, V73AT. 21/10: 0455 V73AT. 24/10; HL1EIZ. 26/10; 0012 ZK3F, 0130 ZK3KY. 27/10: 0046 KL7NO. 30/10: 0125 AH6Q/MM. 4/12: 0019 VK9NS, 0036 VK9LE. 17/12: 0422 KD7P Kure Is. 30/12: 0839 VK9YQS.

2/1/91: 0712 3D2PO. 1/2: 0205 6W1QC on CW. 6/2: TS0AA. 17/2: KE6QS — also by Peter VK4APG, 0645 HL2FH. 18/2: 0350 HL2IPL, HL5BAS, 0455 KD7P/NH7. 24/2: 0140 6W1QC on CW and SSB — also by VK4APG and VK4PU. 26/2: 2255 KL7NO. 27/2: 0800 OH2TI, 0810 OH2BG, 0812 OH2BK, 0908 HL9XB, 0935 DL8HCZ, 0940 DK2PKR, 0941 PA0HIP (worked by many stations in Brisbane), 1002 DJ2AX. 1/3: 0941 KH4AE Midway Is. 2/3: 2245 6W1QC. 3/3: 0920 KH4AF, 2325 AH6HAP/KH7, 2335 NL7OW, 2237 V73AT followed by W6, JA and KH6.

John VK4ZJB says there have been openings to W6 with a good one on 26/3 between 0100 and 0150 and worked W6STI, W6QXZ, N6CW, AA6TT, W6SJR and heard the V73AT keyer. Also on 26/3 at 1150 John and Nev VK4ZNC worked JH1MAD/JD1 on Minami Torishima for a new country. VK4APG and VK4ZNC worked KG6UH/DU1. Later, at 2228, John worked another new country in KP2A and reported that during the morning period contacts from Brisbane were made with A35EM, FM5WD, KP2A, FO5DR, PJ9JT and KH6. Signals appeared to be stronger than in 1989. On the UTC morning of 1/4 VK4KJL started at 2100 with HH7PV. He was soon joined by VK4ZJB and others and the offerings included PJ2, 6Y5, FO5NK, TG9AWS, W6s and ZLs!

On Other Bands

I am indebted to Ron Cook VK3AFW for recognising my general forced absence from the VHF bands, and he has put together the following information to fill in the blank spots, particularly as it applies to the Melbourne area.

Ross Hull Contest

After an absence of six years, Ron has returned to the tunable sections of 2m and 70cm and reports that during the Ross Hull contest of December 1990 there were up to 50 stations active on those bands from the Melbourne area, although rarely were more than four heard on the band at the same time. Regulars worked by Melbourne stations on both bands included Des VK3CY Wedderburn, Roger VK3XRS Sarsfield, VK3DLM Korumburra, Trevor VK5NC Mount Gambier and Chris VK5MC at Hatherleigh. Those on 2m only included Brian VK3BBB Traralgon, VK3DQW Drysdale and Andrew VK7ZHA at Devonport.

Other stations active during this period included VK7ZAP Devonport 2m and 70cm), Colin VK5DK Mt Gambier 2m, George VK3HV Morwell 2m, Graham VK3NE and others portable on Mt Skene 2m and 70cm, VK3BEH Hamilton 2m, Joe VK7JG Launceston 2m, Ian VK3ALZ/P Waranga Basin 2m, VK3ATK Bendigo 2m, VK3AIH Portland 2m and 70cm, VK3ELV Wangaratta 2m and 70cm, VK3DQW/P Grampians 2m and Mark VK5ZMK/P Mt Lofty Ranges 2m and 70cm. Melbourne and surrounding stations included VK3s, BRZ, TU, AUG, ELS, ZBJ, ALZ, VF, TG, YTV, AMZ, ZJC, AFW, CAP, KKW, ACA, KSD and TFE.

Stations on 23cm included VK3s ZBJ, XRS, ZJC and ELV. Les VK3ZBJ and John VK3YTU had regular QSOs on all bands between 50MHz and 10GHz with the exception of 5.6GHz.

Aircraft Enhancement Contacts

Using the above mode, contacts on 2m and 70cm continue each Saturday and Sunday with stations in Sydney and Canberra working into the Melbourne and East Gippsland areas. Participating stations include VK2ZAB, VK1BG, VK1VP, VK3XRS, VK3AUG, VK3AFW and VK3UM.

This is a reliable and under-utilised mode that requires a good, but not extravagant, station. A single Yagi with 10dBd gain, 50 to 100 watts output and a 1dB noise figure preamp with low loss coax will work most stations, given a large aircraft in the right place. Stations well placed in respect to aircraft flight paths and other stations will make regular contacts with lower power on either 2m or 70cm.

Ron VK3AFW says that the basic operating rule is to keep overs short. A station in Frankston (about 30km to the south of Oakleigh) will hear the DX before the Oakleigh station. Shortly after the signals fade out at Frankston they will become audible at Oakleigh. Signals seem to peak earlier on 70cm and do not last as long as 2m signals.

If a fraction of stations capable of using this mode successfully were to be on during the period 8-9am EAST, then the normal operating frequencies of 144.200 and 432.200MHz would need to be supplemented. It appears overseas practice is to use 10kHz increments either side of the nominal calling frequency.

VHF/UHF Field Day

Stations operating portable included VK3BRZ and VK3ATL Mt Cowley, VK3ALZ Mt Macedon, VK3CY near Wedderburn, VK3XEX near Ballarat, VK3KAQ Mt Allambie and VK3YTU Mt Buninyong.

VK6 DX

On the evening of 31/1/91 Brian VK6YAU was heard working Adelaide stations on 432.110. VK3s CY, ZJC, AFW and YTV were able to complete QSOs on 70cm, but no 2m contacts despite S6 QSB peaks. The next morning both VK3CY and VK3AFW worked Brian at 5x9 on both 2m and 70cm.

During the evening of 21/2 the band opened to Albany and Esperance (VK6AS) and several VK3s made good contacts. The following morning mobile stations were working into Albany via the Mount Macedon 2m FM repeater. At 2230 VK3AFW found the Albany beacon weak but steady. Wally VK6WG was on 144.1 working to Adelaide and Mount Gambier. At 2346 VK3AFW had a two-way CW QSO with Wally on 2m at 529 both ways, but no signals from Wally on 70cm. Wally worked stations in Geelong and Hoppers Crossing.

Bass Strait Tests

Andrew VK7ZHA and Ron VK3AFW have been running regular skeds on 2m most weekday mornings, and signals are always there over the 300km path but sometimes the QSB and weakness of the signal prevent a QSO being completed. CW is used and when signals rise above S3 a switch to SSB is made. Whilst VK7ZHA has an excellent takeoff, VK3AFW has a nearby partial obstruction.

Andrew has occasionally worked Des VK3CY during these skeds plus stations in Mount Gambier and once to Eyre Peninsula. On 3/3 he heard VK1AU working VK3XRS and managed a QSO with VK1AU shortly after and signals remained for about 10 minutes.

Beacons

Ron VK3AFW says that the usefulness of beacons has been proven this season. On 2m,

the Albany, Adelaide and Mount Gambier beacons have been particular helpful to Melbourne stations. Unfortunately the Melbourne beacon is still off the air, and the Geelong beacon made only a short appearance. It is believed the VK1 beacon has problems, and a number of others listed as operational are, in fact, not so.

Thanks for writing, Ron. At least the operations of the past few months on the bands above 6m have been documented.

Closure

It's been a busy month since I returned home from hospital. My overall health is good, but I am not yet walking. There seems so much to do after a long absence. I would like to have had more time to prepare these notes, but have done my best in the time available. Errors and/or omissions will have to be accepted, please.

Closing with two thoughts for the month: "The service we render to others is really the rent we pay for our room on this earth" and "One of the more discouraging aspects of life is that we get little praise for what we are going to do next week." Until next month, 73 from The Voice by the Lake.

50-54MHz DX Standings

DXCC countries based on information received up to 1 April 1991. Crossband totals are those not duplicated by 6m two-way contacts.

Column 1: 50/52MHz two-way confirmed contacts
Column 2: 50/52MHz two-way worked
Column 3: Crossband 50/52MHz to 28MHz confirmed
Column 4: Crossband 50/52MHz to 28MHz worked
Column 5: Countries heard on 50/52MHz

Callsign	1	2	3	4	5
VK4ZJB	71	75		4	
VK3OT	67	71			
VK4BRG	60	68			
VK2BA	57	58		4	
VK2QF	56	60			
VK4ZNC	53	61			
VK8ZLX	45	60		1	
VK8GB	42	42			13
VK4ALM	42	48			
VK3AMK	41	29			
VK4ZAL	40	50			
VK3AWY	34	36			
VK5RO	32	45		3	
VK3NM	31	34			
VK5LP	29	31			9
VK3AUI	27	28			
VK6RO	26	26		4	13
VK2DDG	25	26		2	13
VK6HK	23	32		1	3
VK4KHZ	23	34			
VK3XQ	23	25			2
VK4TL	22	23			
VK2KAY	21	23			
VK2BNN	20	21			
VK4BJE	19	25			
VK7JG	18	20			2
VK3TU	17	19			
VK4AYX	17	17			
VK9XT	17	17			4
VK2ZRU	16	19			4
VK9YT	12	14			
VK6OX	10	10		1	1
Overseas					
JA2TTO	48	48			9
YJ8RG	25	25			

The next list is planned for the usual time of August issue. Copy to me by 15 June please. Some amateurs have responded with the photocopies of their QSLs as I earlier requested. I await the other, please.

Stop Press

Steve VK3OT @ 2345Z (6/4/91) worked 9Q5EE in Zaire, central Africa, at 539 on 50.110MHz, which gives him WAC. This was a long path QSO over USA for a possible distance of 31,000km. It is possible some stations in VK2 and VK7 also worked 9Q5EE.

nr

POUNDING BRASS

GILBERT GRIFFITH VK3CQ
7 CHURCH ST, BRIGHT 3741

Learning to Communicate

As you are no doubt aware, the mechanics of actually learning the code have been given plenty of discussion so, for now, let us assume that we have passed our 5wpm or even 10wpm exams, theory and regs, and obtained our first callsign. In this position there are many who manage to fire up a rig and, microphone in hand, proceed to forget all about the code they struggled so hard to learn. As a consequence, they may never find the enjoyment that a dedicated Morsiac has in being able to converse in code, although the Morsiac can pick up a microphone at any time.

Should you wish to put your code knowledge to the test, now is a good time to unplug the microphone from your rig and hide it somewhere relatively inaccessible. This may seem a bit extreme but it is an infallible way of ensuring that you do learn to operate using the code, and are not tempted to take the easy way out every time you get into difficulties. (I would be interested to hear from those who frequent practice nets where microphones are used to see if they agree, and to see what happens if they try discarding the microphone). For you can be sure there are plenty of problems ahead but, if you persevere, you will overcome them; and, if you don't have a microphone, you won't be able to dodge them.

For many people, speaking into a microphone for the first time can be a nerve-wracking experience. I know it was for me, and using a key for the first time was even more difficult. If you do get "the shakes" you can be assured that they **will** go away in time. And they will depart quicker if you are well prepared and not distracted by other things going wrong with your system. So take the time to make sure all your equipment is in order, the antenna(s) are tuned for the section of the band(s) you want to use, and that you can get away from outside distractions, even if you have to use headphones.

It will be a great help if you also have a set of phrases written down that you can use to send from, rather than have to think about phrasing and spelling while you are trying to send. It is preferable to use plain English at first, but a list of abbreviations should be available for your own reference. Many contacts follow a regular pattern, and it will be easier if you stick to that pattern at first. Here are some common phrases that you can have written down, starting with the 3x3 CQ call.

"CQ CQ CQ de VK3CQ VK3CQ VK3CQ K"

"This is my first QSO sorry about the mistakes"(!)

"Name is Gil, Gil, QTH is Bright, Bright"

"You are RST 599"

"Rig here is homebrew running 5 watts, antenna is dipole"

"Many thanks for the contact, 73 and cul ... etc"

You can fill in your own details and anything else you can think of. Naturally your first QSO should be a fiasco, and you may be so excited that you only copy half of everything that is sent. If you are really enthusiastic you can record the whole session on tape and play it back later, but don't worry if you have to ask the other operator to slow down or repeat if necessary; he won't mind at all. I found it convenient to write down everything I received in a notebook, and I still can refer to my very first contact. I'm only sorry I don't have a tape of it.

As anyone will tell you on air, if you can manage one or two QSOs per day you will notice that your "shakes" disappear in less than a week, and you will begin to enjoy contacting the "locals" you find on frequency. In no time at all you will be able to recognise them from the way they send, and you will be copying more and more without mistakes.

You may have heard it said that in just about any endeavour you get out that which you are prepared to put in, and this applies especially to Morse code. Whether you are learning Morse, golf, bowls, hang-gliding,

pistol shooting, or just about anything, there are distinct levels of achievement that you can aim for, and corresponding levels of effort required.

It is said that if you spend one day a week you will not improve and may regress. If you spend a couple of days a week you will stay at the same level. (This point may be the "plateau" that many will tell you about). And if you spend three or more days a week you will constantly improve.

So, if you can manage three or more evenings on air, you should have no trouble improving to a competent level of operating in a matter of weeks. If you want to be able to work at speeds of 20wpm or more in comfort, you will need to spend about five nights a week on air for a weekly total of five or more hours on the key. This is not really as much as it sounds. Usually one QSO will take about 30 minutes, so five hours will give you only about 10 contacts a week. In practice you will often find that you want to talk to more operators and that you are spending two or three hours at a time chatting away with the "locals" who are on the frequency.

While five nights a week may be too much to expect, even a couple of sessions of two or three hours each every week should show a marked improvement in performance. Once you feel yourself beginning to relax at the key while sending, you will start to really enjoy the hobby. You should find too that there is not as much need to write everything down as you copy it; you can just lean back and relax, or think about your answer in the next over, and perhaps make a few notes.

At this stage, you may want to work on your speed and accuracy, or try contesting. The "shakes" will be a thing of the past, and you'll have made it! You will find pleasure in copying difficult sending, or copying through bags of QRN/QRM, and you should have no trouble at all in recognising the "locals" by their "fists". Welcome to the ranks. **ar**

AMSAT AUSTRALIA

MAURIE HOOPER VK5EA
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PACKET: VK5EA@VK5WI

National Co-ordinator
Graham Ratcliff VK5AGR
Packet Address: VK5AGR@VK5WI
Information Nets
AMSAT Australia
Control: VK5AGR
Amateur check in: 0945 UTC
Sunday bulletin commences: 1000 UTC
Primary frequency: 3.685MHz
Secondary frequency: 7.064MHz

(7.064MHz is the frequency presently in use)

AMSAT SW PACIFIC 2200 UTC Saturday, 14.282MHz

Participating stations and listeners are able to obtain basic orbital data including Keplerian elements from the AMSAT Australia net.This information is also included on some WIA divisional broadcasts.

AMSAT Australia Newsletter and Computer Software

The excellent AMSAT Australia Newsletter is published monthly by Graham VK5AGR on behalf of AMSAT Australia, and now has about 340 subscribers. Should you also wish to subscribe, send a cheque for $20 payable to AMSAT Australia addressed as follows: AMSAT Australia, GPO Box 2141, Adelaide 5001.

The Newsletter provides the latest news items on all satellite activities and is a "must" for all those seriously interested in amateur satellites. Graham also provides a software service in respect to general satellite programs made available to him from various sources. To make use of this service, send Graham a blank formatted disk and a nominal donation of $10 per item to AMSAT Australia together with sufficient funds to cover return postage. To obtain details of the programs available and other AMSAT Australia services, send a SASE to Graham.

Subject: RS-12 Mode-K Operational
HR AMSAT News Service Bulletin 089.01 from AMSAT HQ

Silver Spring, MD, 30 March 1991
To all radio amateurs BT
First QSOs on HF mode of new Bird

Andy MacAllister WA5ZIB reports success on Mode K of RS-12.

"At 1625 UTC on 24 March 1991 I heard the 10m telemetry beacon of RS-12. The signal was relatively strong as usual, but the annoying "garbage" in the passband was gone. Instead, I heard SSB activity from what appeared to be shortwave amateur activity. It was. The Mode K transponder was operational. After a few short CQs using an uplink frequency of 21.237MHz, Judd W1PEA came back and I had my first "K" QSO via RS-12. My HF antennas are inverted Vs in the attic and the power output on 15m was about 20 watts. The new bird is working well!"

LO-19 and DO-19 Problems
HR AMSAT News Service Bulletin 089.02 from AMSAT HQ

Silver Spring, MD 30 March 1991
To all radio amateurs BT
LUSAT Experiencing Ground User Difficulties, DOVE in Safe Mode

Numerous ground station operators around the world have reported difficulties accessing LUSAT (LO-19) over the past several days. Ordinarily, connection can be established but little other traffic can be handled. The LUSAT command team in Argentina is examining various possibilities including PACSAT software problems and satellite receiver problems in various hardware configurations. LUSAT is transmitting a short beacon message to users alerting them of the degraded situation.

The DOVE (DO-17) operating system apparently crashed sometime on Thursday 28 March 1991. On Saturday 30 March 1991, the S-band transmitter was successfully commanded-on providing very limited telemetry data, power system balance, and (most importantly) evidence that DOVE is still quite alive. A concentrated effort to place DOVE into full service is planned following diagnostic memory dumps and an operating system reload during April. Special thanks go out to PY2BJO and ON6UG for their critical S-band monitoring duty.

New AO-13 Transponder Schedule
HR AMSAT News Service Bulletin 089.13 from AMSAT HQ

Silver Spring, MD 30 March 1991
To all radio amateurs BT
AO-13 Spring Schedule Announced, AO-10 Not Presently Available

Note: The AO-13 magnetorquing schedule was disrupted by geomagnetic activity last month. The current attitude is thought to be:

BLON=200.2 BLAT=-6.7

The current schedule is:

Off:	MA 220 to MA 035	
Mode-B:	MA 035 to MA 220	
Omnis:	MA 240 to MA 060	

Once the magnetorquing is completed, the "27 March 1991" schedule will be instituted. The AO-13 transponder schedule through 19 June 1991:

Mode-B:	MA 000 to MA 095	
Mode-JL:	MA 095 to MA 125	
Mode-LS:	MA 125 to MA 130	
Mode-S:	MA 130 to MA 140	
Mode-BS:	<discontinued>	Note 1
Mode-B:	MA 140 to MA 256	Note 2
Omnis:	MA 240 to MA 030	

The target spacecraft attitude is:
BLON = 180 BLAT = 0

Note 1: The transponder schedule for 27

March 1991 to 19 June 1991 will see the end of Mode-BS because Mode-S operation while the Mode-B transponder was active was impractical due to interference from Mode-B users.

Note 2: Originally the attitude change back to 210/0 was planned for early May because solar eclipses affecting AO-13 begin on 22 May 1991, and in the past it has been the AO-13 command team policy **not** to magnetorque during eclipses. However, in August this year we have **no** choice but to magnetorque during the eclipses, so it was thought that we could gain some experience in magnetorquing during eclipses in June with a bonus of an extra month of operation with the more favourable attitude of 180/0 in the process.

The downside of this proposal is that **all** transponders will have to be switched **off** from MA 200 through perigee to MA 035 from 22 May 1991 to 24 June 1991 even though magnetorquing will not start until 17 June 1991. Having the transponders **off** from MA 200 to MA 035 from 22 May 1991 until 17 June 1991 will give us an opportunity to gauge the state of the battery prior to the start of the eclipse.

Currently OSCAR-10 is obviously not receiving sufficient solar panel illumination to support even the beacon, much less the transponder. **Please do not** attempt to use OSCAR-10 until further notice. This period of dormancy is expected to last for several months. As soon as OSCAR-10 can support Mode-B transponder operations, it will once again be released for general use. Early reports of OSCAR-10's beacon returning to full strength can be sent to VK5AGR @ PACSAT-1, @ UOSAT-3, @ 8J1JBS, or @ VK5WI.

Proposed New French Amateur Radio Satellite

Bill Magnusson VK3JT

Some sketchy details are coming to hand regarding the long-awaited French amateur radio satellite to be named "Arsene". It seems to have been the basis of a study program over several years at some 27 schools of engineering, universities and colleges in France.

Its history seems to parallel that of the UoSATs in England with input from commercial organisations anxious to avail themselves of a test platform in space. We can only hope that it's as successful as the UoSats.

The only details published so far indicate an apogee height of 36,000km, a perigee height of 20,000km and a period of about 17.5 hours. It will be placed into an equatorial orbit some time in 1992 by the same rocket used to launch a commercial communication satellite called TELECOM-2B.

It will be three axis stabilised, ie earth pointing at all times. It will carry several digital channels on mode B and a linear transponder on mode S as well as some experimental packages with telemetry downlinks for educational purposes./

NASA 2-Line Keplerian Elements

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AO-10                  Epoch                Drag
1 14129U 83 58  B 91087.13157047 -.00000090  00000-0  99999-4 0  6439
2 14129  25.8083 153.6070 6004385 228.6767  61.5135  2.05883150 58557
UO-11
1 14781U 84 21  B 91087.59505918  .00005188  00000-0  94170-3 0  9472
2 14781  97.8121 135.3744 0013772  62.2623 298.0072 14.66570353377634
NOAA-9
1 15427U 84123  A 91087.20021879  .00001658  00000-0  91076-3 0  7186
2 15427  99.1731  98.7687 0014218 293.9234  66.0445 14.12919510324089
MIR
1 16609U 86 17  A 91088.12504994  .00067853  00000-0  67618-3 0  3447
2 16609  51.6071 339.5097 0015537 116.0173 244.2519 15.64886640292620
NOAA-10
1 16969U 86 73  A 91086.97583158  .00002033  00000-0  90085-3 0  5624
2 16969  98.5727 113.2251 0013806 160.0598 200.1146 14.24017780234998
RS-10/11
1 18129U 87 54  A 91087.84980366  .00000097  00000-0  99999-4 0  5670
2 18129  82.9242 116.2301 0013169  54.1551 306.0829 13.72165370188579
MET-2/17
1 18820U 88  5  A 91083.62243123  .00000420  00000-0  36624-3 0  4641
2 18820  82.5438 127.5364 0015019 256.8532 103.0952 13.84460248158985
AO-13
1 19216U 88 51  B 91055.03461838 -.00000020  00000-0  99999-4 0  2406
2 19216  56.8208 107.0310 7134717 248.7854  25.7533  2.09700788 20839
MET-3/2
1 19336U 88 64  A 91079.51407238  .00000049  00000-0  10968-3 0  7149
2 19336  82.5407  81.9375 0017539 348.1699  11.9013 13.16915477127322
NOAA-11
1 19531U 88 89  A 91088.21240260  .00002006  00000-0  11146-2 0  4735
2 19531  99.0716  42.4460 0011494 196.6004 163.4793 14.12038892129185
MET-2/18
1 19851U 89 18  A 91086.27035091  .00000701  00000-0  62028-3 0  4186
2 19851  82.5215   2.8990 0013536 297.1198  62.8595 13.84098645104729
MET-3/3
1 20305U 89 86  A 91083.78492777  .00000043  00000-0  99999-4 0  3274
2 20305  82.5503  20.0872 0018660 355.5322   4.5673 13.15942710 67852
UO-14
1 20437U 90  5  B 91087.70628769  .00001612  00000-0  65281-3 0  3203
2 20437  98.6784 167.6671 0012203  42.3198 317.9034 14.29009848 61491
AO-16
1 20439U 90  5  D 91087.18620936  .00001527  00000-0  61808-3 0  2110
2 20439  98.6708 167.4050 0012088  48.9803 311.2447 14.29098619 61422
DO-17
1 20440U 90  5  E 91086.26097029  .00001580  00000-0  63769-3 0  2118
2 20440  98.6766 166.5200 0012095  52.3672 307.8631 14.29168280 61293
WO-18
1 20441U 90  5  F 91086.44362980  .00001569  00000-0  63259-3 0  2101
2 20441  98.6739 166.7423 0012699  51.3876 308.8507 14.29229004 61327
LO-19
1 20442U 90  5  G 91087.19260508  .00001497  00000-0  60371-3 0  2127
2 20442  98.6767 167.5436 0013001  48.2439 311.9890 14.29306365 61438
FO-20
1 20480U 90 13  C 91069.51316501  .00000031  00000-0  97835-4 0  1895
2 20480  99.0193  70.4245 0540988 165.9117 196.7681 12.83171895 50905
HUBBLE
1 20580U          91086.77285543  .00012573  00000-0  13568-2 0  4033
2 20580  28.4683 242.6984 0005687 185.3941 174.6582 14.86980961 60182
ME1-2/19
1 20670U 90 57  A 91087.00799621  .00000406  00000-0  35581-3 0  1633
2 20670  82.5413  63.3643 0014875 207.0448 153.0109 13.83930967 37777
FY-1/2
1 20788U 90 81  A 91087.59876210 -.00000401  00000-0 -25542-3 0  1211
2 20788  98.9489 122.7652 0015466  46.6461 313.6037 14.01090103 28921
MET-2/20
1 20826U 90 86  A 91087.78580277  .00000650  00000-0  58228-3 0  1182
2 20826  82.5194   1.8190 0014176 103.2175 257.0610 13.83311453 26095
AO-21
1 21087U          91087.14616669  .00000289  00000-0  29279-3 0   264
2 21087  82.9427 293.5967 0036275 122.5402 237.9267 13.74359194  7899
RS-12/13
1 21089U 91  7  A 91083.72491363  .00000292  00000-0  30027-3 0   284
2 21089  82.9293 166.7116 0029654 151.3646 208.9150 13.73876059  6544
         Inclin  RAAN     Eccen   ArgPeri  MeanAnom MeanMotion  Orb
```

If you want to see what the orbit will look like, try the following "home-grown" set of Keplerian elements in your tracking program:

Epoch year	=	1990
Epoch day	=	0
Inclination	=	0 deg
Argument of perigee	=	0 deg
Eccentricity	=	0.2355
RAAN	=	0 deg
Mean anomaly	=	0 deg
Mean motion	=	1.361 rev/day
Drag	=	0 rev/day/day
Orbit No	=	0

Be prepared for some surprises. I think you'll find the orbit characteristics most unusual and very interesting.

Even though the keps I'm using are home-grown, I think they're close enough to make the following observations about the proposed orbit. See if you agree.

Passes will be up to 30 or 31 hours long, and in time we will see nearly two complete orbits

SATELLITE ACTIVITY FOR DECEMBER 1990/JANUARY 1991

1. Launches

The following launching announcements have been received:

Int'l No	Satellite	Date	Launch Nation	Period min	Apg km	Prg km	Inc deg
1990-							
115A	Cosmos 2120	26 Dec	USSR	90.2	336	231	82.6
116A	Raduga 1-2	27 Dec	USSR	1474.0	36535	—	1.4
1991 —							
001A	NATO IVA	08 Jan	NATO	634.0	35463	736	25.9
002A	Progress M-6	14 Jan	USSR	88.4	224	192	51.6
003A	Italsat-1	15 Jan	ESA	626.6	35691	201	7.0
003B	Eutelsat-II	15 Jan	ESA				
004A	Cosmos 2121	17 Jan	USSR	88.7	275	177	82.6
005A	Cosmos 2122	18 Jan	USSR	92.8	432	413	65.0

2. Returns

During the period 16 objects decayed, including the following satellites:

1971-031A	Meteor 1-8	10 Jan
1986-083A	Cosmos 1788	21 Jan
1989-058A	Cosmos 2033	06 Jan
1989-092A	Cosmos 2051	21 Jan
1990-115A	Cosmos 2120	17 Jan

3. Notes

1991-002A Progress M-6 docked with spaceship MIR on 16 Jan to deliver expendable materials and other cargo.

Bob Arnold VK3ZBB

of the satellite!

The squint angle will vary from about 10-15 degrees for southern Australia and only a few degrees worse than that for the polar region limits.

The squint angle will get better as the satellite range increases but will deteriorate slightly as the satellite elevation decreases. The worse possible case looks like no more than about 18 degrees for Melbourne.

With three axis stabilisation there should be no spin modulation. (I wonder if the antennas will have circular or linear polarisation? It will probably be circular, as we'll still have to contend with Faraday rotation etc).

It will rise in our west-north-west, move through north at elevations of around 40 degrees, setting in our east-north-east (from Melbourne).

It will move slowly across the sky from west to east, seeming to hover almost stationary for up to eight hours around apogee. In fact, it's moving in long loops around apogee as the earth catches up to it. The earth's angular velocity is about 0.25 deg/min. At apogee, the satellite's angular velocity is about 0.217 deg/min, at which time its progress across the sky will appear to reverse. At perigee, it is about 0.563 deg/min.

It will spend about six hours moving quickly between apogee "loops".

We will normally see two apogees during each 31-hour pass, occasionally seeing only one around north and occasionally seeing portion of three apogee loops with the west and east apogees on the horizon at AOS and LOS.

From pass to pass, the apogees will increment across the sky from west to east.

Between passes there will be periods of up to 48 hours when it will not be in our sky.

When it rises or sets at apogee, it will be as much as 42,000km range, producing one-way path losses of 192dB at 2445MHz and 177dB at 435MHz.

It will experience quite serious eclipses around the equinoxes, from about 1 March to 15 April and again around 1 August to 15 October. The eclipses could be up to an hour in umbral shadow. When they occur over "Atlantic" longitudes, they may require one or both transponders to be shut down for short periods each orbit to prevent overloading.

The relative motion of the satellite to a ground station will be so low that, even at perigee, the rate of change of doppler shift will be barely noticeable when tuning in a signal. It will vary between the low fractions of one Hz per second on mode B to no more than 2Hz per second on mode S. **ar**

SPOTLIGHT ON SWLING

ROBIN L HARWOOD VK7RH
52 CONNAUGHT CRES WEST LAUNCESTON 7250

As I predicted, the Gulf War ended very swiftly, even before I had finished my last column. The ground offensive lasted only 100 hours, with minimal casualties on the Allied side, while the Iraqis had horrendous casualties in the tens of thousands, primarily as a result of repeated air strikes. The fighting may have ended, but the agony goes on for the civilian population, now caught up in civil war.

On shortwave, there have been significant developments. Firstly, Radio Canada International in Montreal has severely cut back programming on shortwave, because of a budget blowout. The English and French services will now consist of relays from the domestic network, and will presumably have little or no impact on non-Canadians, not conversant with domestic events. Several language sections were axed, including Japanese, Portuguese, Polish and Czech. All programming in the remaining sections has been halved.

Well-known presenter, Ian McFarland, whose shortwave DX program was extremely popular, ironically left for exchange duty with Radio Japan the day the historic announcement was made. The program was also axed. Ninety-three other staffers also were dismissed.

However, the relays of RCI will presumably continue, as other international broadcasters such as the BBC World Service, Radio Austria International, Radio Japan, Deutsche Welle and Radio Korea continue utilising the Sackville, New Brunswick, site to reach North American audiences. It is ironic that I get clear signals of both the BBC World Service on 9515 at 1100 UTC, plus Radio Korea on 11740KHz, via the CBC Sackville site.

Another DX program I have recently come across is on Radio Korea from Seoul. It is aired fortnightly on Sundays at 1040 UTC on 11740KHz. The dates in May will be 5th and 19th. The DX program on Radio KSDA has been changed from 1030 Mondays to 2330 Sundays on 15610 or 0230 on 13720KHz. These times aren't really convenient for us in Australia because of the lack of propagation at those times.

Here in Tasmania we were on Daylight Saving Time to 31 March, when things reverted to Standard Time. The main push for the continuation of Summer Time for an extra two months comes from the travel industry, but is opposed by the commercial and rural sectors.

continued on page 42

The same day saw the introduction of Summer Time into the northern hemisphere. However, this year, the USSR decided not to introduce it after it was pointed out that in 1931, Stalin introduced it, but forget to revert to standard time in winter. So, in effect, the Soviet Union was on Double Summer Time. Yet some republics have opted to introduce Summer Time, namely the Baltics and Moldavia. One republic has even opted to put the clocks back in summer, namely Kazakh SSR.

Well, that is all for this month. Until next time, the very best of 73 and good listening.

ar

ALARA

JENNY ADAMS VK3MDR
70 KANGAROO GROUND RD WATTLE GLEN 3096

Thanks to Dorothy VK2DDB for the following article:

I had a wonderful time at the Gosford Field Day in mid-February. The Field Day Committee welcomed me warmly and I set up my table near the QSL Bureau. So many people stopped to chat and look at the "display". There were photos of the Dubbo Alarameet, magazine articles, a bit about the ALARA contest and a photo of the Florence McKenzie Trophy, plus many other bits and pieces. I could have sold my ALARA teaspoon about six times to "radio widows". I also took a tapestry of the steam train 3801 that I usually do in the winter, in case things became slow, but I did only a few stitches. It was a good way to open conversation, though, and lots of people (mainly retired OMs) want to see how it's going next year!

There were also a few people talking about clubs in their area and I found a chap interested in joining the Hornsby Club — after all, my OM is president. There is also a VK1 who showed interest in the Mid South Coast Club of which I'm also a member. Next year I'll have a list of clubs, if possible.

The Fisher's Ghost Club has some newly licensed YLs and took some application forms and gave me an address to follow up. A few ladies are interested in studying and asked me about training programs. One lady from the Hornsby area has relatives in ZL and is very keen.

The photo of the Florence McKenzie Trophy generated some talk about the contest, and the ladies' group at Dubbo drew comments about the number of YLs in Australia. I'm really looking forward to next year's Gosford Field Day.

In late February, Aimee FK8FA and I finally met. It was a very giggly day with many misunderstandings. Aimee's OM, Michel, does not speak much English, and I know even less French. John had "schoolboy" French from 30 years ago. Michel and John got on very well together, while Aimee and I talked non-stop and the children played coy. Ian had his four wisdom teeth out only two days earlier, so tried to stay hidden. Aimee may be back in September.

Official ALARA net Mondays 3580, QRM UTC 1030. YL DX net "222" Mondays 14.222 0600 UTC.

CHEERS FOR NOW 73/33 **ar**

INTRUDER WATCH

GORDON LOVEDAY VK4KAL
FEDERAL INTRUDER WATCH CO-ORDINATOR
FREEPOST NO 4 AG LOVEDAY RUBYVALE 4702

February Summary

Freq	Date	Time Z	ID	EMN	Logs X	Comments
7053/65	010291	2100+	-	R7B	28	Daily interference
10100	070291	1545	-	A3E	1	B/C music, Arabic???
14023.5	210291	0800+	-	F1B	72	250Hz 3rd reg 24hr stn
14044	020291+	mni	PKJ	A1A	7	Also hrd .030/.33/.035/.040
14048+	020291+	mni	-	J3E+L	48	Rad tel/n0n/tones 24hr stn
The above stn dropped its freq to 14.027/30 AsianR/T on 1002911 QRM??						
14058	dly	mni	-	AC3	68	Dual out/ch "Helschrieber"
14070	dly	mni	VBX	A1A	12	VPO de VBX/also VNF call VPO
14072	dly	mni	RMSU	A1A	2	+RMJY on freq
14075_	dly	mni	VRQ	A1A	35	also on 14069.5 & 14070.3
14080/88	290191	mni	VRQ	A1A	2	NPO on 14085 logged 10 times
Comment: At 070291/1200Z VRQ was using deliberately a B/C program to jam and QRM the freq. May be against our legal use! If so, go to it, sit on him and make this long-term pest vacate the frequency.						
14078	220191	0130	KFB	A1A	13	Freq varies 14076-14103
14095	220191	0800	VPC	A1A	14	Also on at 0130Z
14100	220191	0930	NZB	A1A	12	Also on 14100 & 14103
14215.5	220191	1000	TG1	A1A	13	Previously GT0
14217.5	190291	0505	V3LR	F1/F1B	7	RTTY 500Hz shift
18120	040291	1255+	-	A3E	2	USR B/cast music brd only
18124	040291	1315	-	A3E	2	As above
21032	210291	0300_	UMS	F1/A1A	32	18hr stn USR naval Moscow
21283.5	210291+	0840+	UMS	F1/A1A	41	As above F1B 250Hz shift
21345.5	210291	0945+	???	F1B	44	Transmits "piccolo tones" but mostly 250Hz 18hr stn
21405	2801/02	1000+	??	A3E	14	Comm B/cast & R7B

249950/24980/29120 & 28980... All comm b/casters, country of origin not established positively to date more sustained listening required, please.

My thanks this month to VKs 4AKX, 4BHJ, 4BTW, 4BXC, 4CAS, 4EKA, 4YD, 5TL, 6RO, 6XW.

Congratulations to Karl VK6XW on his patience and persistence with VRQ; it has earned him the WIA Certificate of Excellence No 23. Thanks again, Karl, your notes are a pleasure to read.

It seems that maybe the "Woodpecker" has to some degree been superseded; very little in the way of observations of late. A note on this "bird" taken from *AR* April 1979 by Alf Chandler VK3LC (Fed IW C-ord, then) caught my eye while on a clean-up! It is true that the bird is only heard on the phone bands where voice envelopes can be rejected by the radar video circuit. Also, when someone is sending CW dots at 25wpm the Woodpecker usually QSYs within five minutes. I may consider having the article reprinted in full, sometime if warranted. Conditions on the bands have been variable. It is regrettable that the first 30kHz of 7MHz is close to unusable to amateurs in the evenings, so more logs in this area please. It would appear that many intruding stations appearing on our frequencies are in fact harmonics, which makes them even more difficult to trace. Those with a couple of receivers may like to do some detective work; Col VK4AKX finds this very rewarding ... and annoying! Cheerio for this month. So endeth my bit. **ar**

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KNUTSHELL KNOWLEDGE

GRAHAM THORNTON VK3IY

A brief overview of what other magazines have to say. All of the items given below are available in the Executive Office Library. As a special service to **Members Only**, a photocopy of any complete article is available for $2.50 posted. To circumvent any copyright problems, please be sure to state - 'The information is required for the purpose of private study'. Address your request to The Librarian, Executive Office WIA, PO Box 300, Caulfield South Vic, 3162.'

Antennas – Computer Software

MININEC: The Other Edge of The Sword. Roy Lewallen W7EL, *QST* vol LXXV No 2 Feb 1991 pp 18 - 22. il diags. A review article on an antenna modelling tool which can predict antenna input impedance over both a perfect ground and any real ground, given soil conductivity and permittivity. The near and far fields are also predicted. The limitations of the program are stressed; the reader is cautioned about acceptance of absurd results — hence the title above.

– Half slopers

More On The Half Sloper. John S Belrose VE2CV, *QST* — Tech Corres vol LXXV No 2 Feb 1991 pp 39 - 40. A discussion of the effect of a Yagi antenna on top of a tower also used to support a sloper. Both the radiation pattern and input impedance of the sloper are dependent on the presence and orientation of the Yagi. A $\lambda/4$ sloper showed a resonance at 0.68 times the desired frequency when used on a bare tower.

– Mechanical Details

Rugged Side-Mounting for Rotatable Antennas. Malcolm P Keown W5XX, QST vol LXXV No 2 Feb 1991 pp 30 -32. il diags and photos. A detailed design for a practical approach to the problem of mounting a rotatable antenna at less than the full tower height. The technique described ensures a rotation of 240° or more for a triangular cross-section tower.

– Yagi

Congratulations - It's a Beam! Frank J Burke VO1BZ, *QSTVE* March 1991 pp 3 - 4. il diag. A design for a two element 10m beam, using electrical conduit and a gamma match. Good results are claimed for this lightweight and inexpensive antenna.

Electronic Devices – Automotive

Digital Speedo. Jeff Monegal, *EA* vol 53 No 1 Jan 1991 pp 106-112. il photos, diag, cct, pcb and cmp. A construction project for a digital readout speedo which sounds an alarm if a selected speed is exceeded. The pre-set speeds are 64, 72, 84, 104 and 112kph.

The speed sensor consists of two magnets diametrically opposed on the tailshaft; a stationary coil in close proximity produces voltage pulses. The LED display flashes during overspeed, together with the sound alarm. The sound may be briefly muted when overtaking. The LED intensity is reduced when the headlights are operating. Circuit uses ICs and discrete transistors.

Intelligent Blinker Unit. Jeff Monegal, *EA* vol 52 No 2 Feb 1991 pp 108-112. il ccts, cmp, diag, pcb and photos. Design for a unit to replace standard indicator light flasher units. Unit senses distance run (adjustable) since activating indicators, and disables flashers after this distance. If the indicator switch has not reset, a warning buzzer sounds. A pair of magnets on the tailshaft gives pulses from which distance run is computed.

Versatile Low Cost Car Burglar Alarm. Rob Evans, *EA* vol 52 No 2 Feb 1991 pp 82-89. il cct, cmp, pcb and photos. The device is enabled by a dashboard switch, and disabled by leaving ignition key in 'accessories' position for two seconds. Four input circuits are provided; one has a pre-settable delay to allow normal exit or entry to the vehicle. Either rising or falling trigger voltages may be used to trigger the alarm. Three outputs allow for car horn or separate siren to be sounded, together with ignition disabling circuitry. A warning lamp, in various flashing or stable modes, indicates condition or history of alarm.

– Timers

The 'Flexitimer'. Rob Evans, *EA* vol 52 No 3 March 1991 pp 92-95. il cct, cmp, pcb and photos. A delay or on timer which can be set from seconds to a day. It uses an astable 555 oscillator followed by a 4020 CMOS counter chip. Suggested applications range from a parking meter reminder timer to a watering system controller.

Packet

TCP/IP Command Set Reference. Ian Wade G3NRW, *QEX* No 109 March 1991 pp 3 - 6. An updated version (1.6: 23 January 1991) of this command set presented in tabular form.

Power Supplies

Power Supply for GaAs FET Amplifier. Zack Lau KH6CP, *QEX* No 109 March 1991 pp 10-11. il cct, cmp and pcb. A specific design for an active power supply delivering ± 5V for a microwave pre-amplifier. The negative supply is derived from an NE555 oscillator. A transistor regulates the GeAs FET drain current.

Test Equipment

– Capacitance Meters

Low Cost Meter for Electrolytic Caps. J Emery, *EA* vol 52 No 2 Feb 1991 pp 116-17. il cct. A square wave is applied to the capacitor under test via a series resistor. The resulting triangular wave across the capacitor is applied to a monostable. The frequency adjusting potentiometer is varied until the monostable triggers, indicated by illumination of a LED. The potentiometer scale is calibrated for three ranges of capacitance, extending from 0.47 to 1500 µF. The device can apply a DC voltage to any aged electrolytics for reforming.

– CROs

New CRO Adaptor For Monitors — 1. Peter Phillips, *EA* vol 52 No 3 March 1991 pp 84-90, 107. il cct, cmp, pcb and photos. An interface unit which converts a PC monitor into a 1 MHz storage CRO. The time base is switchable from 5.3 µs to 262 ms; the amplitude display is adjustable from 50mV to 20V per division. Part one of a series of three articles describes the design and construction of a PC board for generating video synchronising pulses, and timing signals for use on the other two boards.

– Product Reviews

QST Compares: Peak-Reading MF/HF Wattmeters. James W ('Russ') Healy NJ2L, *QST* vol LXXV No 2 Feb 1991 pp 33-36, 63. il chart and photos. A direct comparison of 9 different instruments, viz: Coaxial Dynamics 83000-A, Comet CD-160H, Daiwa NS-660-PA, Diamond Antenna SX-100, Heath HM-2140-A, MFJ 815B, Mirage MP1, Nye-Viking RFM-003 and Yaesu YS-60. A chart gives a point-by-point comparison; a detailed review is shown for each product.

FTAC NEWS

JOHN MARTIN VK3ZJC
FTAC CHAIRMAN

More 6m Records

Two new state 6m record claims have been verified:

6 metres: VK3 VK3OT to G4UPS 16921.6km

6 metres: VK6 VK6RO to GI8YDS 14904.1km

Congratulations to VK3OT and VK6RO. A correction to the VK1 1296MHz record published in the last issue: the distance should have read 243.2km.

Transceivers – QRP

The BP-80: An 80-meter CW Transceiver. Mike Agsten WA8TXT, *QST* vol LXXV no 2 Feb 1991 pp 23 - 29, 32. il ccts and photos. A pair of MRF237 final transistors in parallel gives 5W output. Two varactor diodes, switchable between single and parallel use, allow a frequency spread of 20-30kHz per crystal; the tuning resolution of the control potentiometer is 12-15kHz per revolution. The design permits full break-in. An optional three digit frequency display is included. A source for a complete kit is cited.

Transmitters – Frequency Synthesizers

Direct Digital Synthesis. What Is It and How can I Use It? Dr P H Saul G8EUX, *QEX* No 109 March 1991 pp 7-9. il ccts and graphs. A general review of synthesizer theory, culminating in a discussion of DDS.

Glossary of Abbreviations

il The article contains illustrations, a list of which follows.

cct A circuit diagram

cmp A component layout drawing

EA *Electronics Australia*

diag A mechanical drawing

pcb A master drawing from which printed circuits may be produced

QSTVE *QST Canada*

The above items are reproduced from *Amateur Radio Technical Abstracts* Volume 1 1991 ISSN 1036-3025 — to be published.

DT

EDUCATION NOTES

BRENDA EDMONDS VK3KT
FEDERAL EDUCATION CO-ORDINATOR
PO BOX 445 BLACKBURN 3130

A few months ago I set out my ideas of the responsibilities of the Education Co-ordinator. After presentation of this to Executive and extensive discussion, these ideas became the basis for a set of "job specifications" for the person in this position. It is now 10 years since I first took on this position. At that time the job specifications were fairly broad and I was able to attempt or initiate a number of activities, either because there was something I wanted to do or because I felt duty-bound to do it.

Activities which seem to have been successful or of significant value include most of the negotiations with DoTC over examinations, syllabus revision and devolvement, the production of sample examination papers and the Novice Study Guide, dubbing of CW tapes, this column, and provision of information to potential amateurs. Less successful were the attempts to run a weekly on-air Education Net, a project for production of radio materials for use in schools, and the many attempts to establish or maintain links with Divisional people involved in education. I have often been disappointed by the lack of feedback from members and Divisions when I have sought information.

Over the past year or so I have felt that the responsibilities of a Federal Education Co-ordinator have been diminished by the devolvement of examinations. Divisions and examiners are now dealing directly with DoTC in a number of ways that could not be foreseen a few years ago. But, as I have said before, there is now a very great need for co-ordination and co-operation between the various examining bodies. As the initial enthusiasm starts to fade and volunteers find that the workload does not diminish, an efficient examination system will be maintained only if there are ways of sharing the loads.

I am not sure how others see the new examination system. Certainly some potential examiners saw it as an easy and sure-fire money-raising exercise. Many of these are now being disillusioned. Some clubs felt it to be a responsibility which must be accepted for the continuing survival of the club. Others saw a chance to give their students a better, less stressful opportunity to gain the necessary pass.

We must accept, however, that an efficient, effective examination system plays a vital part in maintaining the viability of the amateur service. Unless we have a steady, numerically significant inflow of new amateurs, commercial interests will be casting covetous eyes at our generous allocations of band space.

More importantly, we need those new amateurs as new members of the WIA. It is the activities and negotiations of the WIA, the body representing amateur radio in Australia at both local and international level, which protect our bands and privileges. Although the total number of licensed amateurs in Australia continues to rise, the WIA membership rises at a slower rate. But any benefits gained by the WIA members, and any loss of privileges will affect all amateurs also.

In the devolved examination system we have a simple, cheap potential recruitment scheme. All candidates at examinations run by any WIA division, affiliated club or member should be made aware of the vital role of the WIA, and be given every encouragement to join. It is not sufficient to simply hand out leaflets. Many new recruits will need assistance in starting out after gaining their licences. Similarly, they need positive persuasion to ensure that they are aware of the benefits of membership.

It has always been a tradition of amateur radio that the "old hand" helps the newcomer. By helping the new recruits to become WIA members, we are helping ourselves as well. **ar**

REPEATER LINK

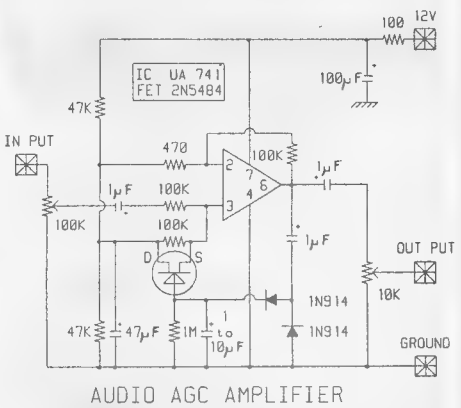
WILL MCGHIE VK6UU
21 WATERLOO CRESCENT LESMURDIE 6076

Audio AGC Amplifier

The circuit I have included in this edition of Repeater Link has been printed in several publications over the years and I can lay no claim to it. Several modifications to the circuit have also been printed but the circuit shown will provide level control of your repeater's audio.

Almost any op amp and N channel FET will work in this circuit. The input 100k pot sets the amount of compression on the audio and the output 10k pot sets the overall gain. A compression level of 6 to 10dB with 0dB gain would be the normal settings. With the gain set at 0dB the AGC amplifier can be placed in line straight after the repeater's receiver with no other changes to the repeater's audio circuitry.

The compression level time-constant is set by the 1M and 1 to 10µf capacitor connected to the gate of the FET. By changing the value of the capacitor the rate at which the audio level is wound up between breaks in the speech can be changed. 2µf would be a good starting point to experiment from. A short time-constant will



AUDIO AGC AMPLIFIER

bring up the background noise, such as vehicle road noise, to an unpleasant level.

Briefly, the FET acts as a variable resistance dependent on input audio level. The input 100k resistor connected to pin 3 and the FET act as a potentiometer. Minimum input audio level is around 100mV, and maximum input audio level around three volts. The two 47k resistors set the DC bias for the op amp so that a grounded supply can be used. Note the 470 ohm resistor is 470 ohm, and not 470k ohm; it is easy to make the mistake. When construction is finished, a quick DC check is to measure pin 6; it should be half supply voltage.

A modified version, including low frequency and high frequency adjustments to the audio response, has been developed. This circuit allows for the best sounding audio for your repeater, such that the output audio can sound as good, and often better, than the input audio. In a future article I will present this circuit.

ar

DIVISIONAL NOTES

VK2 NOTES

TIM MILLS VK2ZTM

AGM Deferred: The 1990/91 AGM has been deferred until Saturday 1 June 1991 at Amateur Radio House. When nominations closed on 20 March there were insufficient for a quorum. A new closing date of 17 April was set. The formal notification appears in the annual report booklet. Listen to VK2WI for updates.

Historical Records: The VK2 historian, Jo VK2KAA, maintains an extensive record system on VK2 callsigns. You have no doubt met up with her at the various field days, completed the questionnaire and had your photo taken. It is important that details, however brief, are maintained. If you have never supplied anything, ask at the divisional office for a form, or check with your local club. One of the benefits from the records is the ability to check up on previous callsign holders. If you obtain a new call and are interested in who may have had it previously, then drop a note to the office via PO Box 1066, Parramatta 2124 or by fax on (02) 663 1525. Don't forget your own details.

Another important source of historic records is old QSL cards, and a reminder that these are also maintained in VK2. If you have cards to pass on from estates or the shack clean-out, remember VK2 before other collectors.

Oxley Region Field Day: This will take place as usual at Port Macquarie over the June holiday weekend. Details from the club at PO Box 712, Port Macquarie 2444. About 100 amateurs and members of their families attended the 43rd Urunga over the Easter weekend. If your club or group has an event coming up, remember to advise divisional office, both for its information as well as the broadcast. Give plenty of notice and send in a separate news item for each week publicity is required. Use A4 format, double-spaced typed or printed with a margin to the left for the announcer's file. Post, fax or deliver to Parramatta prior to 6pm Friday to meet the deadline. The Sydney Radio Group advises that its annual show will be at St Ives showgrounds on a date in August to be advised.

Third Gladesville/AUSSAT: Planning is under way for the next test. Listen to your local divisional broadcast for progress details.

New Members: The following joined the NSW Division during March, and a warm welcome is extended to them.

D R	Brown	VK2GFT	Epping
S V	Church	Assoc	Kincumber
R	Coster	VK2TGB	Sydney
C N	Cowan	VK2PZ	Kilaben Bay
J	de Caires	VK2MDC	Beverly Hills
E	Downs	VK2GKK	Bilgola Plateau
N P	Eichorn	VK2AOH	Orange
G	Frith	VK2GDF	Medowie
P K	Jordan	VK2KEY	Mount Warrigal
J M	Lawrence	VK2NSW	Liverpool
BS	Martin	VK2PWP	Woy Woy
R C	Selby	Assoc	Concord
S D	Smith	VK2AET	St Ives
D	Woollett	VK2IT	Beverly Hills

The May Trash 'n Treasure is scheduled for Sunday afternoon, 26th. Details will be given as usual on the broadcasts. Most of the publications which appear listed on the inside back cover of *Amateur Radio* are available from the office at Parramatta, 11am-2pm Monday to Friday and 7-9pm Wednesday nights. Phone orders and other calls between noon and 1pm (02) 689 2417.

5/8 WAVE

JENNIFER WARRINGTON VK5ANW

Tea Tree Plaza Club

Perhaps because Adelaide is such a small city compared with Sydney or Melbourne we don't seem to have many suburban clubs, so it is quite an exciting event when we hear of a new club being formed. The latest is the Tea Tree Plaza Club (at least that's the general area, I'm not sure that that is its official title!) If you live in that general area and are interested in joining, the steering committee consists of Peter Watts VK5ZFW, Peter Gregg VK5PBD and Frank Ayling VK5NFA. Contact Frank on 251 4776 or Peter Gregg on 264 1070. I have a feeling that this might have stemmed from the Westfield displays — an added bonus!

Speaking of displays, the Chamber of Commerce and Industry has invited us to be part of a two-day exhibition at Wayville Showground on 22-23 June. After the success of the Westfield displays, council again feels that we should "grab" the opportunity. They will be looking for volunteers, so please, let a member of council know if you can help over this weekend.

Interstate Co-operation

We often hear of interstate rivalry so it's good to hear about some interstate co-operation. I understand that over the Easter weekend a group of SA ATVers (about nine, I think) was heading in the direction of Mildura to help the western zone WICEN group with communication for the River Murray powerboat races. I hope a great time was had by all.

Diary Dates

28 May. The ESC team of David Minchin VK5KK and Mark Spooner VK5AVQ will talk on "Kits & Bits".

25 June (probably). Ian Hunt VK5QX will give a video/talk on "The USA, Alaska and through the Pacific".

A Call to all Holders of a Novice Licence

Now you have joined the ranks of amateur radio, why not extend your activities?

The Wireless Institute of Australia (N.S.W. Division) conducts a Bridging Correspondence Course for the AOCP and LAOCP Examinations.

Throughout the Course, your papers are checked and commented upon to lead you to a successful conclusion.

For further details write to:

The Course Supervisor
WIA
PO Box 1066
Parramatta NSW 2124
(109 Wigram Street, Parramatta)
Phone: (02) 689 2417

11am to 2pm Monday to Friday
7 to 9pm Wednesday

QSLs FROM THE WIA COLLECTION

KEN MATCHETT VK3TL HON CURATOR WIA QSL COLLECTION
PO BOX 1 SEVILLE VIC 3139. PHONE: (059) 64 3721

The Marshall Islands — A Spoiled Paradise? (Part 1)

The Marshall Islands lie approximately halfway between Cape York Peninsula and the Hawaiian Islands. They consist of 34 islands and atolls roughly 240km apart running NW/SE for 1300km. Most of them conform to the classical atoll type having a narrow low-level land mass (mainly of islets) enclosing a lagoon. The eastern chain, Ratik ("Sunshine") contains Majuro (the capital and commercial centre), the western chain Ralik "(Sunset") contains Kwajalein, Eniwetok, Ebon and Bikini. All of the islands lie just a few degrees north of the equator and slightly west of the international date line.

The islands were probably discovered by the Spanish navigator, Loiasa in 1526, although some historians attribute the discovery to Alvaro de Saavedra in the year 1527. They owe their name to a little-known British seafarer, Captain John Marshall, who "rediscovered" them in 1788. The first European settlement was made by Germany 90 years later, in 1878. In the year 1885, and with the prior consent of the British authorities, Germany formally occupied the islands. (Spain had no effective administration of the islands despite proclaiming sovereignty in 1874). During World War I, Japan occupied the Marshalls, taking it from the Germans who had administered the islands as a district of German New Guinea. As a reward for its war efforts on the Allied side, the Marshalls became a Japanese mandate in 1920 under the League of Nations and, in 1935, was militarised (in violation of the mandate). It was from bases in the Marshall Islands that Japanese forces invaded Ocean Island and the Gilbert Islands (as they were then known). Invasion forces also from the islands occupied Nauru (see QSLs from the WIA Collection, *AR* May 1990). This was the situation until, after bitter fighting, US forces regained the territory in February 1944.

J9SIR

Early pre-war country listings do not specifically show the Marshall Islands. The prefix J had been assigned to Japan from an early date but there was no sub-division of the prefix except for J8 (Chosen — later called Korea). The *Radio Amateur Handbook* of 1937 lists the J prefix assigned to "The Japanese Empire" under Japan J1-J7, Chosen J8 and Formosa (later Taiwan) J9. There was a country listing for the Marshall Islands in *Amateur Radio* May 1937 (based on ARRL information) but no prefix was given. Both the magazine *Radio* January 1938 and *QST* Jan 1939 list the Marshalls as J9 and in January 1940 "Radio" listed it as J9P. No country lists were published by QST after 1939 until the post-war period.

There seems to have been very little pre-war activity from the Marshall Islands. However, the August 1936 edition of *QST* does report activity by J9PA, a Mr Suzuki on the island of Oulai. The same station was reported active in 1940 (*QST* May 1940). His prefix of J9P seems to be in accordance with the magazine *Radio* country listing of January 1940. Somewhat surprising is the use of the J prefix after the war by US service personnel. The J9SIR QSL shown belonged to Dave Fugman, who had the Stateside call W8SIR.

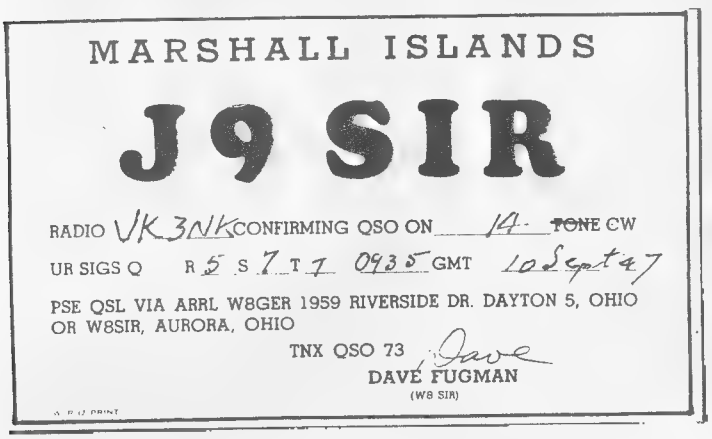
It was sent to SK Jim Ballinger in September 1947. The WIA Collection also holds the QSLs of J9AAQ (1948), W8RWW/J9, W6RJG/J9 (1946) as well as J9LG (1946). In 1948, listings were showing the newly assigned IARU prefix of KX6, the allocation being KX6AA-KX6ZZ.

KX6BU

This is the call of the Kwajalein (pronounced "Quad-ja-lane") Amateur Radio Club. Kwajalein is the US "Pacific Missile Range Facility" in the islands. A QSL from KX6BK states that it is the "largest atoll in the world". (This is quite correct, its enclosed lagoon measuring no less than 2300 sq km). The pictorial KX6BU QSL shows the Kwajalein settlement and its large airstrip on the most southerly point of the atoll. Other QSLs such as KX6DB and KX6DC show typical Nike Zeus missiles which play a part in the missile program. In fact, unarmed inter-continental missiles are fired from western California to land plumb in the lagoon, such is the accuracy of today's missile tracking. On the northern tip of Kwajalein Atoll is the settlement of Roi-Namur, KX6DC being the local amateur radio club callsign. Kwajalein was the first Marshall Islands territory to be captured by the Japanese in WWII. It is said that during its liberation, the concentration of fire by US forces exceeded any artillery barrage of either of the two World Wars.

KX6CG

This QSL, dated December 1961, was sent to the author from Eniwetok Atoll. It shows a drawing of an atomic bomb explosion. A series of US atomic experiments took place during the period 1946-1958, when no fewer than 66 bombs were detonated on Eniwetok and Bikini Atolls. It was the greatest atomic testing program in history, and strict military control over the native population was introduced during the period. (The Marshalls had become a US Trust Territory after the war under the United Nations). As shown on the KX6CG (Coast Guard) QSL, the US CG operates a LORAN (Long Range Radio, Navigation) communication facility on the island. Other QSLs such as KX6BP and KX6BT show pictures of the atomic blast. The atoll was handed back to the native Marshallese in September 1976 after 32 years of occupancy. (The native peoples had been living in exile on nearby Ujelang Atoll during the atomic testing period). It took many years for the atoll to become sufficiently "cool" radioactively, especially after the explosion on the atoll of the


MARSHALL ISLANDS

J9 SIR

RADIO VK3NK CONFIRMING QSO ON 14 ~~TONE~~ CW

UR SIGS Q R 5 S 7 T 7 0935 GMT 10 Sept 47

PSE QSL VIA ARRL W8GER 1959 RIVERSIDE DR. DAYTON 5, OHIO
OR W8SIR, AURORA, OHIO

TNX QSO 73 Dave
DAVE FUGMAN
(W8 SIR)

world's first hydrogen bomb on 1 March 1954. Amateur radio operation has taken place from Bikini Atoll, the site of the first atomic bomb explosion in the Marshalls in 1946. The WIA Collection contains, amongst others, the QSLs of KX6BS on Bikini in 1956 and the interesting QSL KX6USN, the station of a "re-survey" scientific expedition of 1947 apparently whose aim it was to assess the 1946 atom bomb effects. (Little was known about the long-term effects of atomic radiation in those early post-war years). Although some attempts have been made at re-settlement on Bikini, surveys have shown that the atoll will not be adjudged safe for human habitation for another 30 to 90 years.

To be continued. ar

CLUB CORNER

Seated: FAMPARC members, Jessie Buchannan VK3VAN and husband, Gordon VK3BGB (club secretary, and Gwen Matthews.
Standing: SPARC members, Margaret Hamilton VK3END (social secretary), Vic Vickery VK3DEA (president), Frank Feldman VK3BC (secretary), Phil Carne VK3AAM (treasurer).
Seated beside Phil is Margaret Feldman.

Southern Peninsula Amateur Radio Club Lunch

Recently, the Southern Peninsula Amateur Radio Club (based at Rosebud) held its annual luncheon at the Rye RSL. The function was well supported by members and wives and we welcomed visitors from our neighbouring club, Frankston and Mornington Peninsula Amateur Radio Club (based at Carrum Downs). An enjoyable time was had by those in attendance. A number of other members wished they also could have been there, but were on the sick list due to a throat virus which has been raging in this part of the world.

TONY HAMILTON VK3ENE
PUBLICITY OFFICER, SPARC

South East Radio Group Inc

Well, folks, the time is fast approaching when that special weekend in June comes around. Of course I'm talking about the ever popular South East Radio Group Annual Convention to be held over the weekend of 8 and 9 June 1991.

The South East Radio Group has set a standard for amateur conventions which is unsurpassed in Australia. A good balance is maintained between trade displays and competitions to ensure that a wide range of tastes is catered for.

This year we are offering many exciting events which include the Australian Fox Hunting Championships. However, additional emphasis is to be placed on the home brew competition. Traditionally, this competition may not have been very encouraging to begin-

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ners to the home brew arena, so this year we have created a number of sections to cater for the novice to expert. We hope that this will encourage everyone who likes to dabble in home-built equipment to show their prowess and compete for some attractive prize money.

The South East Radio Group convention promises to be a very popular spot on the amateur calendar so make sure that you don't miss out; book your accommodation early. A list of recommended motels and caravan parks is available by writing to the convention co-ordinator at the address below.

Hope to see you there.

DAVID EDWARDS VK5FF
CONVENTION CO-ORDINATOR
SERG
PO Box 1103
MT GAMBIER 5290

Place this in a prominent position
Place this a prominent position
Place this in a prominent position
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the North Queensland
Radio Convention
for those interested in any facet of Radio Technology
27, 28 & 29th September 1991
at the James Cook University Townsville Campus.
For further information contact....
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Townsville Amateur Radio Club (Inc)
P.O. BOX 964 TOWNSVILLE 4810
or telephone 077-797869, 77-733487, 077-799721 or 077-791161

Townsville Amateur Radio Club

The Townsville Amateur Radio Club wishes to advise that the date for the North Queensland Radio Convention previously published was incorrect.

The correct dates for this most popular biennial meeting of all those interested in radio communications and related technology are: Friday 27, Saturday 28 and Sunday 29 September 1991 at part of the campus at James Cook University. Watch this space closer to the event for details of the convention program.

PO Box 964 Townsville 4810. Phone (077) 79 7869, 73 3487, 79 9721 or 791 1161. **ar**

SILENT KEYS

DUE TO INCREASING SPACE DEMANDS OBITUARIES MUST BE NO LONGER THAN 200 WORDS

We regret to announce the recent passing of:

Mr C W Perry	VK2EO
Mr Richard Norman	VK2BDN
Mr Murray Palmer	VK3AMP
Mr Geoff Lewis	VK3BTT
Mr Harold Champion	VK4AKU
Mrs Phyllis Le Grand	VK4CPL
Mr E S Smith	L60069

Richard Norman VK2BDN

Richard died suddenly on 21/3/91 aged 66. He was born in Croydon and lived there all his life.

He started work in Sydney at Paul's, eventually moving to Slade's Radio.

He joined the AIF in 1940, and served with 2nd 11th AGH on Morotai where he formed a film unit.

After the war, he began work at GEC, where he remained until his retirement.

Dick was licensed as VK2ZCF in 1955 and finally acquired his full licence in 1969 as VK2BDN.

He was a keen builder of equipment and very particular in his construction work, receiving much pleasure from this.

Dick was the complete amateur and participated in fox hunts and scrambles and held 28 Ross Hull certificates, which must be something of a record. In 1982 he received the Ron Wilkinson Award. He held 1.2GHz record and was active on 10GHz for many years, and was involved in ATV and radio station 2RDJ.

Richard was straightforward and a good friend and will be sadly missed.

ROSS CRADDOCK USHER VK2ZRU

Geoff Lewis VK3BTT

I sadly write to report the passing of my very good friend, Geoff VK3BTT. Geoff passed away on 17 March 1991, following a short illness. On 18 February he had suffered a stroke. He was aged 66.

I first met Geoff in January 1979 when we were both novices and up to February this year my logbook records 575 contacts with him, plus half that many again which I forgot to log.

He had been a member of the Gippsland Gate AR Club, the EMDRC and, of course, the WIA.

Geoff will be sadly missed by his family and all those who knew him.

Farewell my kind and gentle friend; perhaps one day we will meet again. 73OM.

GEOFF VALENTINE VK3GV

Claud Singleton VK4UX

Claud passed away 14 September 1990 in Gatton Hospital, aged 76. Born in Fremantle, 22 January 1914, he started work as an apprentice baker at age 12. Claud started in radio in Rockhampton in the early 1930s; self-taught, he obtained his AOCP on 9 March 1935.

Claud joined the Army in 1939, serving four and half years and obtaining the rank of Staff Sergeant. After the war, he joined the PMG/Telecom and worked in many towns in North Queensland. Claud left his mark on many communities as foundation member of amateur and service clubs, as Scout master, as a pianist and piano teacher, and also with his photography, having many published in magazines.

Claud was a WIA member of long standing, past president of Dalby ARC, member of Ipswich and Toowoomba ARCs. He wrote many articles for AR and other magazines, and was news editor for WIAQ (1940s).

He was a news broadcaster (1950s), ran the call-back, held office on state council several times (most recently 1988 and 1989), obtained three RD certificates, won NFD twice. Claud was personally responsible for dozens of amateurs obtaining their callsign, being education officer for many clubs, as well as giving individual tuition. Claud was WICEN co-ordinator for Zone 3 until recently. VK4UX was a call widely known throughout the world, one time being known as "voice of Theodore". He leaves behind everlasting memories.

Sadly missed by his wife Jess and family,

together with all that knew him. Vale Claud, "not enough time".

Bruce Metzroth VK4BLM.

Claud Singleton VK4UX

Claud founded the Dalby ARC, and was a contributor to VK4 council for many years; this included driving from Gatton to Brisbane for council meetings.

He was education officer for Toowoomba, Ipswich and Dalby clubs, and was a regular net attender including Queensland club liaison net, Queensland net, Coral Coast net and founder of Kookaburra net.

He was a "very young" 76.

Council and members thank Claud for his contribution, and offer condolences to Jess and family.

David Jones VK4KLV

Harold Champion VK4AKU

Born in Melbourne in 1914, Harold spent his youth in the Bendigo area. His consuming passion for things electronic began in the 3rd Division Army Signals in 1932. In 1935 he joined the Victoria Police Force and was soon involved as a wireless operator in patrol cars and D24 HQ.

Around 1940 he joined the then-Department of Civil Aviation with which he remained until his retirement. His service included periods in Mackay, Rockhampton, Tennant Creek, Lord Howe Island, Adelaide and Mt Gambier.

Harold and his wife Win made frequent forays from their retirement home on top of the hill at Buderim. Amateur radio was a constant companion on their travels around Australia, across America, Africa, Canada and Europe. His children, born with the travel itch, have now scattered around the world, but have maintained links with home via amateur radio.

Harold maintained contact with his former work colleagues via the DCA and OTC nets and was an active participant in the ANZA and Coral Coast nets on a daily basis.

His sudden illness and passing came as a shock to all who knew him. A strong and gentle man, he will be sadly missed.

CU Dad

Ian VK2BWB

OVER TO YOU

ALL LETTERS FROM MEMBERS WILL BE CONSIDERED FOR PUBLICATION BUT MUST BE LESS THAN 300 WORDS. THE WIA ACCEPTS NO RESPONSIBILITY FOR OPINIONS EXPRESSED BY CORRESPONDENTS

Comments about Comments

Why should the Packet Radio (Buzz Saw) Group be allotted an exclusive section of the 20m band, even though only 17kHz? The 20m band in its entirety should be available to all licensed to use it. What will be the next "elitist" group to get a similar privilege? The Packet Group should be prepared to share the bands with other users.

Re WARC-92, may I suggest that the WIA push for the widening of our MF band and HF bands rather than going for a lot of narrow bands throughout the RF spectrum. I agree 100 per cent with Dr S Bockner VK5VN re VNG and the problems of trying to set a clock from these signals. WWV/WWVH, or even JJY make it easier. Doing a time check last December with WWVH VNG came up. WWVH was still copiable until a station broadcasting a cricket match came up on top of these two! As for comments by Murray Young VK4GH, it is a case of "you must get the customers through the door first before you can sell them anything". Now for the Morse/no Morse argument. I, for one, would hate to see it done away with, for many good reasons. However, I would not mind seeing the Morse requirement being dropped for use of frequencies above 25MHz.

The government of the day can and does allot MF and HF bands to a variety of users qualification free.

Graham J Muirhead VK4WEM
23 Cunningham St
Warwick 4370

Amateur Textbooks

I read with interest your update on the need for a book or series of books to provide all the information that a complete beginner needs to go from novice to full call.

As a 62-year-old raw beginner with no electrical/electronic background, I was successful at the last DoTC-held NAOCP examination in February 1990, and upgraded to AOCP with the WIA examination in February 1991.

Other than establishing a definite study pattern, I attribute my success to three publications.

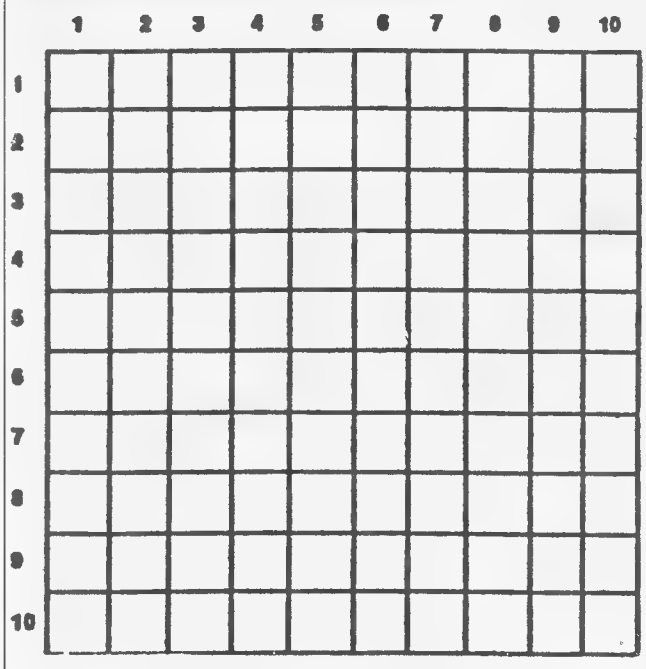
Two from the WIA education service as noted by Rex Black VK2YA, and the third was *Radio Theory for the Amateur*, by Swainston (available through WIA bookshops).

This last publication, while containing several errors (which I believe are corrected in the new edition) is, in my humble opinion, an excellent stand-alone textbook covering the full DoTC theory syllabus for novice to full call.

I would recommend it as an essential publication for any prospective amateur.

Wes Tyler VK2WES
PO Box 43W
West Gosford 2250

Morseword No 50



Across
1 Substance
2 Run
3 Sharp
4 Filch
5 Secure
6 High sound
7 Donate
8 Hindu widow
9 Bed linen
10 Planet

Down
1 NSW cheese town
2 Leave
3 Fibs
4 Beginning
5 Church house
6 Cover
7 Finished
8 Fairy's tool
9 Ins and ____
10 German city

Audrey Ryan © 1990

Solution Page 56

Reorganisation?

I found the letter from VK4XH (April '91 Over to You) very interesting. Reg says the WIA has to be market driven and provide what the customers want. How's this for some lateral thinking then? Fact 1 — less than 50 per cent of licensed Australian amateurs support the WIA by way of subscription. Fact 2 — *AR* magazine consumes more than 60 per cent of WIA revenue. Fact 3 — the commercial opposition magazine shows no sign of folding and, in fact, appears to be printed on better quality paper than *AR*. Without denigrating in any way the tremendous effort which goes into *AR* , how about Federal Executive doing a deal with Syme Media Pty Ltd for *AR* to become a pruned down insert in *AR*? Shock! Horror! Heresy! But wait — there is precedent for this. *Newsweek* finished up inside the *Bulletin*. *ETI* has been absorbed into *EA*. All licensed amateurs and others would then have the option of either buying the mag from a newsagent, not buying it, or subscribing to it from Syme Magazines. This would probably free Federal Office from continual complaints of non-receipt through the mail. WIA subs could probably be lowered somewhat, possibly leading to increased membership. WIA news would receive much greater circulation than at present. Advertisers would love it — no need to split the advertising budget. With the additional technical backing, a combined mag would be a resounding success, in my opinion. (Not to mention the fact that I would have only one pile of mags growing on my bookshelves instead of two!)

Ray Jones VK7RQ
314 Rokeby Rd
Howrah 7018

(Shall we burn him at the stake? Ed)

Value of CW

Allow me to correct, in no uncertain terms, my friend Geoff VK4VLI (Mar *AR*) who appears to think that — quote, "CW has nothing to do with real ham radio". What utter rubbish!

Geoff, I suggest you do a bit of listening on 10, 15 and 20m when the bands are open around the globe, like they are at present. And, on the weekend 9/10 March, it was bedlam, especially on 20m. The regular BERU CW contest unfortunately clashed with a JA contest, but despite the horrific QRM, several VK stations made over 500 contacts in the 24 hours. It is a well known fact that you can beat the QRM on CW, but not on SSB. So, don't knock this popular mode, Geoff.

In conclusion, isn't it strange that nearly all criticism of CW appears to come from persons who do not — or won't try to — use this mode.

T D Dowling VK4OD
10 Moorabinda St
Buderim 4556

Fortress CW

In reply to Graham B Jackson VK3TFN, continued lowering standards for HF operating surely will make the fortress walls crumble. At what point do you want this CB mentality to stop?

Countries tried the experiment of dropping Morse (eg Spain) and quickly reintroduced the test.

It is a fact of life you have to be qualified to hold an amateur licence. Again I quote "No matter what our personal compassionate feelings may be".

I have many disabled amateur friends, and mention Ron McD Stuart VK2ASJ of Stockton NSW. Ron, a very disabled person, studied for the examination, Morse code and the lot, with help from his friends, and successfully passed. Difficulty in communicating by voice and very limited use of his arms did not deter Ron; he used Morse code. His Morse key is mounted on the floor under his desk, and he sends good CW with his foot. What a sense of achievement! So, please don't tell me any more about not being able to learn to read and send CW for a full call because, frankly, the fit-and-well whingers make me and many others quite sick. Per Ardua Ad Astra.

Peter Alexander VK2PA
Nandari
Rollands Plains
via Telegraph Point 2441.

Standards?

Having read the article "An Overview of EMI/EMC in Australia" in March *AR* for the third time, I have to ask whether somebody can explain what it is about. If it purports to demonstrate that "something" is being done about EMI in Australia then it could have said so much more simply. It it is an extract (as opposed to a "reprint" as stated) then more explanation is needed for credibility.

The letters "CISPR" in the fourth line are not defined. Some of the table headings (eg "EN") are not explained (on "BS" I can put my own interpretation). If the article sought our help with EMI (which is important) then it needed more explanations.

The problems with "standards" is that they are **not!** My early physics taught me that decimal multipliers (Deca, Hecta, Kilo ...) are written with a capital letter and divisors (deci, centi, multi ...) in lower case. Without this elementary standard the whole system is confusing.

If we had a standard we might be spared from journalists writing about a "400 milliwatt power station" (400mW) or a 20 millibytes hard disk for a computer (20mb), the latter being twenty-thousandths of a "bit", which I had believed to be the smallest amount of memory.

An excuse has been given that a "Kilosomething" could be confused with a degree Kelvin. What rot — the whole is greater than the part, and usually the context will differentiate. If confusion **is** likely, then a degree sign should be written after K for Kelvin.

Furthermore, why do we speak of "kill-omm-itturs" (km)? Do those who do so measure their fuel in "kill-lolly-turs (kl) or weigh their vehicles in "kill-ogg-rms" (kg)? I think not. The comparison with "speedometer" and "barometer" does not stand up because both are entities for measuring, not a standard measurement.

In a technical discipline such as ours, these "standard" inconsistencies are bad news. Could this be another pioneering field for *Amateur Radio* to lead the way?

Peter Hughes VK6HU
58 Preston St
Como 6152

*(It **was** a reprint, and could not be altered. CISPR is in the acronym list in Feb* AR *p27. EN is "European Norm". BS is "British Standard". Small k for kilo is standard, and large K for Kelvin. Agree with your comment on this, and agree strongly about mispronounced distances. Ed)*

RTTY Info Etcetera

I write with a suggestion for the next data issue of the magazine ... say for next February. When you next publish the data section would you think about including a list of the RTTY and AMTOR mailboxes, together with their locations, hours of operation and frequencies?

You could use the magazine space to request operators of these BBS-type devices to register these details with the WIA — not for permission to operate, but rather as a service to newcomers to the mode.

When such a list was published it would also give ideas about where a new mailbox system could be placed to supplement those systems already in use. Such a list should also include countries in our vicinity, including New Zealand and Indonesia.

Finally, I was saddened to read the long list of gear that has been reported stolen (in the same issue of *AR)*. So much of that gear appeared to have no distinguishing marks. In the past, I have marked my gear with my callsign letters. It made me think: This weekend I **will** mark all my radio equipment with my driver's licence number and an "A" for the ACT. This will make the gear easy to track back to me. Perhaps if all amateurs were encouraged to do this, the market for stolen gear would dry up.

Richard Jenkins VK1UE
PO Box 101
Charnwood ACT 2615

(How about it, mailbox operators? Ed)

Reply to VNG Complaint

I must admit to being surprised by the comments from Dr Bockner regarding time-code transmissions from VNG, surprised that someone more scholastic than myself should find it so difficult to learn. I found that five minutes of listening was all that was required. The use of a clock would only seem to refer to someone like Dr Bockner, who may need one handy while they are trying to work out a simple mathematical addition. With regard to interference with the signal from WWV, I must point out that VNG transmits on 5MHz, 24 hours per day, and on 10MHz and 15MHz, transmission is from 8am to 5pm Eastern Standard Time, times during which WWV is not normally obtainable at my QTH. Also, VNG does not transmit the time-code during the times that WWV announces the time using voice operation, so it is still possible to listen to WWV if desired.

It should further be noted by Dr Bockner that there are numerous people, both in Australia and overseas, who rely on VNG for accurate time signals. Also, there are time signals being transmitted by other than WWV and VNG on these same frequencies, so I suppose this means that all these transmissions are to move to suit?

This, to me, is just another case of knocking Australian efforts. Why not get behind Australian products; there are many Australians who use and rely on VNG.

As a final comment, I wonder if Dr Bockner knows the difference between WWV and WWVH, and which in fact he is receiving, also, why have two time signal transmissions from the same country?

Richard Moore VK2FRM
Camden Valley Way
Narellan 2567

Ten-Metre Piracy

Bravo VK5KJR, many of us can remember the piracy of our 11m band aided and encouraged by commercial interests in this country and overseas. How can one be anything but dismayed at the prospect of cheap 10m equipment being imported and sold freely over the counter. These units are already selling for less than $300. What happens when they fall to around $200 or less?We can kiss goodbye to 10 metres, that's what!

We've never been able to justify the retention of our very generous band allocation by usage or population, there just aren't enough of us. I've even heard it said that it wouldn't matter a great deal if we lost half our band space. Don't fall for that one! I don't subscribe to that theory at all. Our frequencies are **all** important. Sure, I don't use them all. No one could. It's doubtful if there has ever been an amateur who has regularly used all the bands. The point is that we don't know what's just around the corner. Who, 20 years ago would have foreseen some of the modes that are popular today? In a few years we may be experimenting with new modes requiring more band space than we have now. We can't afford to be complacent and give away any of our bands. Look what's happened to the 27.8MHz marine band and, I fear, what is about to happen on the HF bands with the easy availability of sets like CODAN.

As amateurs we should push for laws or regulations insisting on the production of an appropriate licence at the point of sale of **all** transmitting equipment. This is overdue by 20 years. It is done in the case of guns in the interests of public safety; surely spectrum anarchy falls into the same category. If you agree, contact your WIA divisional rep and let your feelings be known. Don't sit back and leave it to others (and then go crook later). If you don't believe this can happen, have a close listen to the bottom end of 10 metres **now.** We can make a difference. We can affect government if we speak with one voice.

Bill Magnusson VK3JT
359 Williamstown Rd
Yarraville 3013

Cure for Piracy?

I would like to offer my personal support to James Robertson VK5KJRs letter in *AR,* April 1991. As he correctly states, we humans tend to be poor students of history.

Whilst I believe his comments to be correct, I have never been able to fathom out why our legislators in their wisdom appear to act only after "the horse has bolted".

Surely suitable laws could be enacted such that only persons with an appropriate category of radio licence are able to purchase and/or own radio transmitting equipment.

We would certainly not be the first country to have such laws, and it would save the taxpayer untold dollars currently being spent on DoTaC staff trying to track down unlicensed operators in the radio spectrum.

There is already a precedent for such legislation. In most, if not all, states of Australia it is illegal to purchase or own most type of firearms or explosives without an appropriate permit or licence. So why not radio transmitting equipment?

Now is the time to act; let's not let this degenerate into another 27MHz debacle, because history does tell us that in cases like this, once the floodgates have been opened there is little or no chance of turning back the tide.

Bruce R Kendall VK3WL
8 Walwa Place
Werribee 3030

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HF PREDICTIONS

ROGER HARRISON VK2ZTB
THE APOGEE GROUP

This month the charts provide predictions directly in signal strength (which you can relate to S-points), a much more usable and understandable form.

The base reference signal strength is **1 μV in 50 Ohms,** which, on the "Standard Scale For Amateur S-Meters" (see Ref 1), is between S3 and S4, as the following table shows:

μV in 50 ohms	S-points	dB(μV)
50.00	S9	34
25.00	S8	28
12.50	S7	22
6.25	S6	16
3.12	S5	10
1.56	S4	4
0.78	S3	-2
0.39	S2	-8
0.2	S1	-14

The charts are otherwise exactly the same format, and based on the same parameters, as I have used previously.

New Prediction Program

This development follows some nine months of work in conjunction with a colleague of mine, Jack Middlehurst. An entirely new propagation prediction program has been developed, based on the model of the ionosphere developed by T Damboldt and P Suessman and used in their program MINIFTZ4, the program I was using to generate the predictions up till now.

This new program (written in the C language), known as Graph-DX, features a friendly 'user interface', based on a series of menu screens and a variety of output graphs, which can all be displayed on-screen (EGA, Hercules, VGA) as well as output to a variety of printer types. What you see on the screen is what you get on the printer (WYSIWYG propagation predictions!)

Output graphs can be presented directly in terms of **signal strength at the receiver** - either dB relative to 1 mW in 50 ohms (dBm), or dB relative to 1 μV in 50 ohms. Output in dB relative to 1 μV/metre field strength, is retained, too.

Plans are in hand to market both professional and amateur versions of Graph-DX. The first public demonstration, at the Blue Mountains Radio Club on 1st March, met with an enthusiastic reception. Stay tuned!

St Peter & St Paul Rocks DXpedition

Advice from Stephen Pall VK2PS, says PY0S will be activated in May from this remote outpost in the mid-Atlantic ocean off the coast of South America. From Australia, both the short path and the long path pass over the polar regions; bad news both ways!

Figure 1 shows signal strength predictions from Graph-DX for the 14 MHz band, short path, from VK East (top), South (middle) and West (bottom). Modest beams and 400 watts output is assumed. Horizontal axis is UTC time, signal strength is the vertical scale on each plot. The solid line is for 90% of days, dashed line for 50%, and the dotted line for 10% (enhanced conditions).

Ref 1 Signal Strength, "S" Meters and Preamps, Gordon McDonald VK2ZAB, *AR* July 1990 p 14.

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	17.8	5	13.5	-1	6	5	0	-8
2	17.5	0	13.2	-11	0	1	-2	-8
3	20.3	0	16.0	-21	-4	0	0	-3
4	24.5	2	18.5	-30	-8	0	2	1
5	27.9	2	21.2	-35	-10	-1	2	2
6	27.5	2	20.9	-35	-10	-2	2	2
7	26.3	2	19.9	-32	-9	-1	2	1
8	24.4	2	18.5	-24	-5	1	2	0
9	21.9	2	16.6	-16	-1	2	1	-3
10	19.4	3	14.7	-8	2	3	-1	-8
11	17.1	4	12.9	0	4	2	-5	-15
12	15.3	6	11.5	5	5	0	-11	-24
13	14.1	10	10.6	10	5	-3	-17	-34
14	13.4	15	10.0	14	5	-6	24	...
15	13.0	22	9.7	18	5	-9	-29	...
16	12.6	25	9.5	20	4	-12	-34	...
17	12.4	27	9.4	20	3	-14	-37	...
18	11.4	29	8.7	17	-3	-22	...	...
19	10.2	31	7.8	11	-12	-35	...	...
20	10.1	31	7.8	11	-13	-36	...	...
21	13.0	28	10.1	23	6	-10	-32	...
22	18.4	21	14.2	30	22	13	1	-13
23	17.4	19	13.3	21	18	12	2	-10
24	19.3	14	14.8	12	14	12	6	-2

VK EAST - MEDITERRANEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	18.0	12	13.7	10	12	9	1	-8
2	17.6	4	13.2	-2	5	4	-1	-9
3	20.4	2	16.1	-14	0	3	1	-3
4	24.9	4	18.9	-25	-5	2	4	3
5	28.3	3	21.2	-31	8	0	3	3
6	27.9	2	20.9	-32	-9	-1	3	2
7	27.0	2	20.2	-31	-9	-1	2	1
8	25.3	2	18.9	-25	-5	1	2	0
9	23.0	2	17.3	-19	-2	2	1	-2
10	20.1	2	15.1	10	1	2	-1	-7
11	17.2	2	12.9	-3	2	0	-6	-16
12	14.6	4	10.9	3	2	-3	-15	-29
13	12.7	7	9.4	6	0	-11	-28	...
14	11.4	12	8.4	8	-5	20	...	...
15	10.8	20	7.9	9	-9	-29	...	...
16	10.6	25	7.8	10	-11	-33	...	...
17	10.6	27	7.9	11	-11	-33	...	...
18	10.6	28	8.0	12	-11	-34	...	...
19	10.1	29	7.6	9	-17	...	...	...
20	9.4	30	7.2	4	-24	...	...	...
21	9.7	30	7.4	6	-21	...	...	...
22	11.9	28	9.2	18	-2	-21	...	...
23	14.8	24	11.5	26	15	3	-13	-31
24	18.9	18	14.3	23	20	14	4	-6

VK STH - MEDITERRANEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	18.3	18	13.9	22	19	13	3	-8
2	17.9	10	13.5	8	10	7	0	-10
3	20.8	7	16.4	-4	5	7	3	-2
4	25.4	7	19.3	-14	1	6	7	4
5	28.6	5	22.2	-21	-2	4	6	5
6	28.5	4	21.5	-24	-4	2	5	4
7	28.2	3	21.3	-25	-5	2	4	3
8	27.5	3	20.8	-24	-4	2	4	3
9	26.1	3	19.8	-20	-2	3	4	2
10	24.1	4	18.2	-12	2	5	4	0
11	21.4	5	16.1	-4	5	5	1	-5
12	18.8	7	14.2	4	7	4	-2	-12
13	16.4	10	12.3	10	8	1	-10	-24
14	14.5	14	10.9	14	6	-4	-20	-39
15	13.3	20	10.0	17	3	-11	-31	...
16	12.6	24	9.4	18	1	-16	...	...
17	12.3	26	9.3	18	-1	-19	...	...
18	12.1	27	9.1	18	-2	-21	...	...
19	12.0	28	9.1	18	-2	-22	...	...
20	11.1	28	8.5	14	-9	-31	...	...
21	10.1	29	7.7	8	-18	...	...	...
22	10.1	29	7.8	8	-18	...	...	...
23	12.8	27	9.6	21	3	-15	-39	...
24	17.5	23	13.4	31	21	11	-2	-18

VK WEST - MEDITERRANEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	17.3	12	11.8	10	12	8	1	-8
2	16.6	14	11.3	14	13	8	0	-11
3	16.0	17	11.0	18	14	8	-2	-14
4	15.2	19	10.5	20	14	7	-5	-18
5	15.0	21	10.4	22	15	6	-6	-20
6	15.5	23	10.8	25	17	9	-3	-18
7	17.1	22	12.0	26	20	13	2	-9
8	17.7	15	13.2	18	15	9	0	-12
9	15.0	9	11.1	9	7	1	-10	-23
10	12.9	0	9.6	2	1	-5	-16	-29
11	11.6	-11	8.6	-2	-1	-7	-17	-31
12	10.9	-19	8.0	-4	-2	-7	-16	-29
13	10.7	-32	8.0	-11	-7	-10	-20	-32
14	10.7	...	7.9	-20	-13	-16	-25	-37
15	10.7	...	8.0	-27	-18	-20	-29	...
16	10.1	...	7.6	-35	-26	-29	-39	...
17	9.4	...	7.2	...	-34	-38	...	...
18	9.7	...	7.4	-39	-31	-34	...	...
19	12.0	-29	8.8	-15	-7	-8	-14	-24
20	16.3	-8	12.6	-16	-4	-2	-5	-11
21	20.9	1	14.4	-15	-1	1	1	-3
22	19.7	5	13.6	-6	4	5	3	-2
23	18.8	8	12.9	2	8	7	3	-3
24	18.0	10	12.3	7	10	8	2	-6

VK EAST - EUROPE L.P.

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	16.2	9	11.3	7	8	5	-3	-13
2	15.5	12	10.9	12	10	5	-5	-17
3	15.0	17	10.6	17	12	4	-7	-21
4	14.4	19	10.2	20	12	3	-10	-26
5	14.2	21	10.1	21	12	2	-11	-28
6	14.7	22	10.5	23	14	5	-9	-25
7	16.1	21	11.5	24	17	9	-2	-16
8	17.1	15	13.0	18	14	7	-4	-16
9	14.6	10	11.3	10	6	-1	-14	-28
10	12.7	2	9.8	4	0	-7	-20	-36
11	11.5	-6	8.8	0	-2	-10	-22	-38
12	10.9	-14	8.3	-2	-3	-9	21	-36
13	10.6	-24	8.3	-7	-5	-11	-22	36
14	10.5	...	8.1	-19	-15	-19	-30	...
15	10.4	...	8.0	-31	-24	-28	-39	...
16	9.8	...	7.7	...	-36	...	...	...
17	9.3	...	7.3	...	...	...	...	...
18	9.5	...	7.5	...	...	...	...	...
19	11.3	...	8.6	-37	-26	-26	-34	...
20	14.7	-15	11.7	-17	-5	-4	-7	-13
21	18.8	-5	13.9	-23	-7	-3	-3	-7
22	18.6	-4	13.1	-20	-5	-1	-1	-5
23	17.7	0	12.4	-11	0	1	-1	-7
24	16.8	4	11.8	-1	5	3	-1	-10

VK STH - EUROPE L.P.

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	15.8	-1	11.1	-5	0	-1	-6	-15
2	15.1	2	10.7	1	3	0	-8	-18
3	14.7	6	10.4	5	5	0	-10	-22
4	14.1	8	10.0	8	5	-1	-13	-26
5	14.0	10	10.0	10	6	-1	-13	-28
6	14.4	12	10.4	12	7	0	-11	-25
7	15.7	13	11.4	13	10	4	-6	-18
8	17.5	13	12.7	14	12	8	0	-10
9	19.0	11	13.8	12	12	8	1	-8
10	17.0	6	12.7	4	5	1	-6	-17
11	14.5	-1	10.7	-1	0	-4	-13	-25
12	12.6	-10	9.3	-5	-3	-8	-17	-30
13	11.4	-19	8.4	-7	-4	-9	-18	-30
14	10.8	-37	7.9	-16	-12	-16	-25	-38
15	10.5	...	7.9	-30	-23	-26	-36	...
16	10.5	...	7.7	-39	-29	-32	...	...
17	10.3	...	7.7	...	-36	-38	...	...
18	9.8	...	7.4	...	...	...	...	...
19	9.2	...	7.0	...	...	...	...	...
20	9.4	...	7.3	...	...	...	...	...
21	11.3	...	8.2	-31	-21	-23	-30	...
22	14.8	-15	11.4	-18	-7	-6	-9	-16
23	17.2	-8	12.2	-20	-7	-4	-5	-10
24	16.4	-6	11.5	-13	-3	-2	-5	-12

VK WEST - EUROPE L.P.

APOGEE ARTS

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	11.5	9	9.1	8	-2	-14	-33	...
2	11.5	3	8.8	5	-1	-11	-27	...
3	11.1	-5	8.6	1	-3	-12	-26	...
4	14.5	0	11.3	0	1	-2	-11	-23
5	21.1	5	16.3	-7	3	5	2	-4
6	26.9	5	20.5	-10	3	7	7	3
7	25.8	5	19.3	-9	4	7	6	2
8	23.5	6	17.6	-4	6	7	5	0
9	20.6	7	15.4	1	7	6	1	-6
10	17.7	7	13.2	5	7	4	-4	-14
11	15.0	8	11.2	7	5	-1	-12	-26
12	13.0	10	9.6	10	3	-7	-22	...
13	11.7	14	8.6	11	0	-13	-33	...
14	11.0	22	8.1	14	-2	-19	...	...
15	10.9	27	8.0	15	-3	-21	...	...
16	10.9	29	8.1	16	-3	-22	...	...
17	10.8	30	8.1	17	-3	-22	...	...
18	10.3	32	7.7	15	-7	-28	...	...
19	9.6	32	7.3	11	-12	-35	...	...
20	9.8	32	7.6	12	-10	-32	...	...
21	10.5	31	8.1	15	-6	-27	...	...
22	10.0	29	7.7	12	-10	-31	...	...
23	9.4	20	7.3	7	-14	-34	...	...
24	9.6	11	7.6	5	-11	-29	...	...

VK EAST - AFRICA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	25.6	9	19.5	1	11	12	10	4
2	25.7	8	20.0	-1	10	11	9	4
3	25.6	8	19.4	-1	9	11	9	4
4	25.5	8	19.3	0	10	11	9	4
5	25.2	9	19.1	2	11	12	9	4
6	24.3	10	18.5	6	13	13	9	2
7	22.7	11	17.3	12	15	13	7	-1
8	20.7	14	15.7	21	19	13	3	-8
9	18.8	18	14.4	29	20	11	-2	-18
10	16.9	21	12.9	29	17	4	-13	-32
11	15.4	22	11.7	27	11	-4	-24	...
12	14.4	23	10.9	24	6	-11	-34	...
13	13.7	24	10.3	22	2	-17	...	...
14	13.1	25	10.0	20	-2	-22	...	...
15	12.5	25	9.5	16	-7	-29	...	...
16	12.1	26	9.2	14	-10	-34	...	...
17	11.0	26	8.4	7	-22	...	...	...
18	9.6	27	7.4	-5	...	...	...	...
19	9.4	28	7.3	-7	...	...	...	...
20	12.1	26	9.1	14	-10	-34	...	...
21	17.3	18	13.4	26	16	5	-10	-28
22	22.0	12	17.0	16	17	14	6	-3
23	24.6	11	18.9	10	15	15	10	3
24	25.2	9	19.3	4	13	13	10	4

VK EAST - ASIA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	22.4	21	16.9	26	26	23	16	7
2	22.3	21	16.8	26	26	23	16	7
3	22.0	22	16.6	28	27	23	16	6
4	21.5	23	16.3	30	28	24	15	5
5	20.4	25	15.5	34	30	23	13	2
6	18.7	30	14.2	40	32	23	10	-4
7	16.8	32	12.7	40	28	17	2	-14
8	14.9	35	11.2	37	22	9	-9	-28
9	13.0	37	9.8	32	14	-1	-22	...
10	11.6	39	8.7	27	6	-11	-36	...
11	10.6	40	8.0	23	0	-20	...	...
12	10.0	41	7.5	19	-4	-27	...	...
13	9.7	41	7.4	17	-7	-31	...	...
14	9.5	42	7.1	16	9	-33	...	...
15	9.3	42	7.1	15	-11	-35	...	...
16	8.4	43	6.5	9	-19	...	...	...
17	7.8	44	6.0	3	-30	...	...	...
18	7.8	44	6.0	3	-30	...	...	...
19	9.9	38	7.4	17	-6	-28	...	...
20	13.9	29	10.8	28	15	2	-15	-35
21	17.9	25	13.8	29	24	16	4	-9
22	20.4	23	15.7	28	26	21	12	1
23	21.5	22	16.4	27	26	22	14	4
24	22.2	21	16.8	26	26	23	15	6

VK EAST - STH PACIFIC

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	26.8	5	21.8	-23	-3	3	5	4
2	25.5	8	20.5	-12	3	8	8	6
3	24.1	11	19.4	1	11	13	11	6
4	22.9	16	18.3	15	19	17	13	6
5	22.3	20	17.7	27	26	22	15	7
6	21.8	24	17.2	36	31	25	16	7
7	21.0	23	16.7	37	30	23	13	2
8	19.9	22	15.0	36	27	18	6	6
9	17.6	24	13.3	34	23	12	2	-18
10	15.9	25	12.0	31	18	5	-11	-29
11	14.7	26	11.1	28	14	0	-18	-39
12	13.9	27	10.4	26	10	-4	-24	...
13	13.4	25	10.1	22	7	-8	-28	...
14	12.8	18	9.6	15	3	-10	-30	...
15	12.5	11	9.4	9	0	-11	-29	...
16	11.4	0	8.7	3	-4	-15	-32	...
17	10.1	-13	7.7	-1	-7	-18	-35	...
18	9.9	-21	7.7	-3	-6	-15	-30	...
19	12.8	-13	9.5	-8	-4	-7	-16	29
20	18.3	-4	14.1	-17	-4	-2	-5	11
21	23.4	0	18.0	-27	-7	-1	0	2
22	26.4	1	20.2	-32	-9	-1	1	0
23	27.3	2	20.8	-32	-9	-1	2	1
24	27.5	3	21.1	-30	-7	0	3	3

VK EAST - USA/CARRIBBEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	11.0	15	8.3	9	-6	-23	...	...
2	11.1	11	8.5	8	-3	-18	-38	...
3	10.7	3	8.3	4	-5	-18	-38	...
4	14.0	5	10.9	5	3	-4	-17	-32
5	20.3	7	15.7	0	7	6	1	-6
6	25.4	6	20.0	-2	7	9	7	2
7	25.0	6	20.0	-3	7	8	6	1
8	23.5	7	18.7	0	8	8	5	-1
9	21.5	7	17.0	3	9	8	2	-5
10	18.9	8	14.9	7	9	5	-2	-13
11	16.4	8	12.8	8	7	1	-10	-23
12	14.0	10	10.9	10	3	-6	-21	-39
13	12.3	13	9.5	10	-1	-15	-35	...
14	11.2	19	8.6	11	-6	-24	...	...
15	10.6	25	8.1	11	-10	-30	...	...
16	10.4	27	7.9	11	-12	-34	...	...
17	10.3	29	7.9	11	-13	-35	...	...
18	10.1	30	7.8	10	-15	-38	...	...
19	9.6	31	7.4	7	-19	...	...	...
20	9.1	31	7.1	3	-25	...	...	...
21	9.3	31	7.3	5	-22	...	...	...
22	9.6	31	7.5	8	-18	...	...	...
23	9.1	28	7.1	4	-23	...	...	...
24	9.3	21	7.3	4	-19	...	...	...

VK STH - AFRICA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	26.5	8	20.2	-1	10	12	10	6
2	27.4	8	20.7	-3	9	11	11	7
3	27.8	8	20.9	-4	8	11	11	7
4	27.6	8	20.8	-4	8	11	11	7
5	27.2	9	20.5	-1	10	12	11	7
6	26.4	9	19.9	2	12	13	11	6
7	24.9	10	18.8	8	15	14	10	4
8	22.8	13	17.2	18	19	15	8	0
9	20.0	17	15.1	28	21	13	2	-12
10	17.3	19	13.1	28	16	5	-11	-30
11	14.9	21	11.2	23	7	-9	-31	...
12	13.0	22	9.7	17	-5	-25	...	...
13	11.8	24	8.8	10	-15	...	...	...
14	11.1	25	8.3	6	-23	...	...	...
15	10.9	25	8.1	4	-25	...	...	...
16	10.9	25	8.1	4	-26	...	...	...
17	10.9	25	8.2	4	-26	...	...	...
18	10.2	25	7.8	-1	-35	...	...	...
19	9.4	26	7.2	-10	...	...	...	...
20	9.5	26	7.3	-8	...	...	...	...
21	12.0	24	9.4	12	-13	-37	...	...
22	16.8	10	13.0	13	8	0	-14	-30
23	21.7	9	16.7	8	12	10	3	-5
24	25.0	9	19.1	3	11	12	9	3

VK STH - ASIA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	25.0	12	18.9	20	22	19	13	4
2	25.6	13	19.1	21	23	20	14	6
3	25.5	13	19.1	22	24	21	14	6
4	24.7	14	18.7	25	25	21	14	5
5	23.0	16	17.4	29	26	21	11	1
6	20.8	21	15.7	37	28	19	7	-6
7	18.7	23	14.2	36	25	14	0	-17
8	16.7	25	12.6	34	20	7	-11	-31
9	14.4	28	10.8	29	11	-5	-28	...
10	12.6	30	9.4	23	1	-19	...	...
11	11.4	31	8.5	17	-7	-31	...	...
12	10.4	33	7.7	10	-18	...	...	...
13	9.8	33	7.2	6	-25	...	...	...
14	9.6	33	7.1	5	-27	...	...	...
15	9.7	33	7.2	5	-26	...	...	...
16	9.3	34	7.2	4	-28	...	...	...
17	8.8	35	6.8	0	-36	...	...	...
18	8.5	35	6.5	-5	...	...	...	...
19	8.7	31	6.7	-3	-38	...	...	...
20	10.7	23	8.4	9	-14	-37	...	...
21	14.6	18	11.3	18	7	-6	-25	...
22	18.9	15	14.5	20	16	9	-2	-17
23	22.1	13	16.9	20	20	15	7	-3
24	24.0	13	18.1	20	21	18	11	2

VK STH - STH PACIFIC

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	28.4	6	22.4	-21	-1	5	7	6
2	27.1	9	21.5	-8	6	10	11	8
3	25.7	14	20.6	6	15	16	15	11
4	24.4	18	19.5	20	23	21	17	11
5	24.0	20	19.0	30	28	25	18	11
6	23.5	19	17.6	36	30	24	16	6
7	20.6	21	15.4	35	27	19	9	-3
8	17.6	24	13.1	33	22	12	-2	-18
9	14.9	26	11.1	29	14	1	-17	-37
10	12.9	28	9.5	23	5	-11	-34	...
11	11.6	29	8.5	18	-2	-22	...	...
12	10.9	30	8.0	15	-7	-29	...	...
13	10.7	26	8.0	12	-8	-29	...	...
14	10.7	17	8.0	9	-7	-25	...	...
15	10.7	7	8.0	5	-7	-21	...	...
16	10.1	-4	7.7	1	-8	-20	...	...
17	9.5	-15	7.2	-1	-8	-20	-38	...
18	9.7	-21	7.5	-2	-6	-15	-30	...
19	12.0	-15	8.8	-6	-3	-8	-18	-32
20	16.4	-6	12.7	-14	-3	-3	-7	-15
21	21.3	0	16.3	-22	-5	0	-1	-5
22	25.0	1	19.1	-29	-8	-1	1	0
23	27.1	3	20.5	-30	-8	0	3	2
24	28.3	4	21.3	-28	-6	1	4	4

VK STH - USA/CARRIBBEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	10.1	24	7.8	11	-9	-29	...	...
2	11.4	17	8.8	13	0	-14	-35	...
3	14.9	13	11.2	13	8	0	-12	-27
4	21.8	11	16.9	10	14	12	6	-1
5	26.9	8	20.5	2	12	13	11	6
6	28.8	7	21.8	-2	9	12	11	8
7	28.7	7	21.5	-4	8	11	10	7
8	27.7	7	20.8	-4	8	10	9	6
9	26.0	7	19.5	-2	8	10	8	3
10	23.7	8	17.8	4	11	11	7	0
11	20.7	10	15.5	9	12	9	3	-6
12	17.7	12	13.3	14	12	6	-4	-16
13	15.0	16	11.2	17	10	0	-14	-31
14	13.0	21	9.7	18	5	-8	-28	...
15	11.7	26	8.7	18	0	-17	...	...
16	11.1	29	8.2	17	-3	-22	...	...
17	10.9	30	8.2	16	-4	-24	...	...
18	10.9	31	8.1	17	-4	-24	...	...
19	10.9	32	8.2	17	-4	-24	...	...
20	10.3	32	7.8	15	-8	-30	...	...
21	9.7	33	7.4	11	-14	-37	...	...
22	9.9	33	7.6	12	-11	-34	...	...
23	10.6	32	8.0	16	-5	-26	...	...
24	9.9	31	7.5	12	-11	-34	...	...

VK WEST - AFRICA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	23.3	9	17.9	6	12	11	7	0
2	24.3	9	18.5	2	11	11	8	2
3	24.8	8	18.8	0	10	11	8	3
4	25.0	8	19.4	0	10	11	8	3
5	24.9	9	18.8	0	10	11	9	3
6	24.7	9	18.7	2	11	12	9	3
7	24.2	10	18.4	6	13	13	9	2
8	23.1	11	17.6	11	15	13	8	0
9	21.4	13	16.3	19	18	14	5	-5
10	19.2	17	14.6	28	20	11	-1	-16
11	17.1	19	13.0	27	16	4	-13	-32
12	15.1	20	11.5	24	8	-8	-30	...
13	13.6	22	10.3	19	-1	-21	...	...
14	12.5	24	9.5	15	-9	-33	...	...
15	11.9	24	9.0	11	-16	...	...	...
16	11.5	24	8.8	8	-20	...	...	...
17	11.2	24	8.5	6	-24	...	...	...
18	11.0	24	8.4	4	-26	...	...	...
19	10.1	25	7.8	-3	-39	...	...	...
20	9.1	25	7.0	-16	...	...	...	...
21	9.0	26	7.0	-17	...	...	...	...
22	11.5	17	8.6	5	-19	...	...	...
23	16.2	10	12.6	13	6	-3	-18	-36
24	20.7	9	15.9	10	12	9	1	-9

VK WEST - ASIA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	24.1	8	18.3	6	12	11	7	0
2	25.2	8	19.0	6	13	12	8	2
3	25.6	8	19.4	7	14	13	10	3
4	24.7	9	18.7	9	15	14	9	2
5	23.2	11	17.6	14	17	14	8	0
6	21.1	14	15.9	21	19	14	5	-6
7	19.1	18	14.5	27	21	12	0	-13
8	17.2	23	13.0	31	20	9	-7	-24
9	15.6	25	11.8	30	16	3	-15	-35
10	13.9	27	10.4	26	9	-6	-28	...
11	12.0	30	9.0	21	0	-19	...	...
12	10.9	32	8.1	16	-7	-30	...	...
13	10.2	33	7.6	12	-13	-37	...	...
14	9.8	33	7.3	10	-17	...	...	...
15	9.7	33	7.3	9	-18	...	...	...
16	9.5	34	7.3	8	-19	...	...	...
17	9.3	34	7.2	7	-21	...	...	...
18	8.8	35	6.7	3	-28	...	...	...
19	8.6	31	6.6	1	-30	...	...	...
20	8.8	21	6.8	1	-25	...	...	...
21	10.9	14	8.0	8	-8	-25	...	...
22	14.8	11	11.4	12	6	-4	-19	-37
23	19.1	10	14.7	11	11	6	-2	-14
24	22.3	9	17.0	8	12	10	4	-4

VK WEST - STH PACIFIC

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	26.8	4	20.8	-33	-9	0	4	4
2	25.5	7	20.5	-25	-4	3	6	6
3	24.1	9	19.4	-13	3	8	9	6
4	22.9	12	18.3	-2	9	12	10	6
5	22.3	16	17.7	10	16	16	13	7
6	21.7	20	17.2	22	23	21	15	8
7	21.0	23	17.0	30	28	23	16	7
8	20.0	27	15.6	36	30	24	15	5
9	19.1	27	14.8	37	29	21	11	-1
10	17.4	26	13.1	35	24	14	0	-15
11	14.8	29	11.1	31	17	4	-14	-34
12	12.7	31	9.5	25	8	-8	-30	...
13	11.4	29	8.5	19	1	17	...	...
14	10.8	20	8.0	13	-3	-20	...	...
15	10.7	11	8.0	9	-3	-17	-39	...
16	10.8	1	8.1	5	-2	-13	-31	...
17	10.9	-5	8.2	2	-1	-10	-26	...
18	10.3	-15	7.8	0	-2	-10	-24	...
19	9.6	-31	7.3	-5	-6	-13	-27	...
20	9.8	...	7.6	-15	-13	-19	-32	...
21	12.3	-19	9.1	-9	-1	-3	-10	-20
22	17.0	-7	13.1	-20	-5	-1	-3	-9
23	22.0	-1	16.9	-31	-9	-2	0	-2
24	25.6	2	19.6	-35	-10	-2	2	1

VK WEST - USA/CARRIBBEAN

APOGEE ARTS

HAMADS

TRADE

● ELECTRONICS TECHNICIAN. Position available in modern well-equipped workshop for a top workshop repair technician. Analogue repairs to wide range of power supply equipment. No field service. Wages and hours negotiable. Prefer 5-30 years experience. Contact Martin Griffith (02) 888 9371.

● WEATHER FAX programs for IBM XT/ATs. RADFAX2 is a high resolution shortwave weatherfax, Morse & RTTY receiving program. Needs CGA, SSBhf radio and RADFAX decoder. Also RF2HERC, RF2EGA & RF2VGA, same as RADFAX2 but suitable for Hercules, EGA and VGA cards respectively, $35; SATFAX is a NOAA, Meteor and GMS weather satellite picture-receiving progam. Uses EGA or VGA modes. Needs EGA or VGA colour monitor and card and Weatherfax PC card, & 137MHz receiver, $45. All programs are on 5.25" OR 3.5" disks (state which) & documentation, add $3 postage. ONLY from M Delahunty, 42 Villiers St, New Farm, 4005. Ph: (07) 358 2785.

● AMIDON ferromagnetic cores: for LF/HF/VHF/UHF applications. Send DL size SASE for data/price to RJ & US Imports, Box 431 Kiama NSW 2533 (no enquiries at office, please . . . 14 Boanyo Ave, Kiama). Agencies at: Geoff Wood Electronics, Sydney; Webb Electronics, Albury; Assoc TV Service, Hobart; Electronic Components, ACT; Truscott Electronics, Melbourne.

FOR SALE - NSW

● KENWOOD HF station, base/mobile including TS-130S, DFC-230, PS-30, AT-180, MC-50, MC-42, mobile mount & cables, service Manuals, packing. $1250 the lot. Ph: (066) 526135 VK2AWA.

● YAESU FT690R all mode 6m Tx/rec with operator's manual and original carton. Bill VK2NZ. Ph: (043) 23 1286 QTHR.

● HYGAIN Explorer, 14, 4-element tribander, new, $900.FL2100B linear, $650; FV107, $75. Jim VK2AKJ QTHR. Ph: (02) 427 1398.

● ICOM IC730A HF txvr, very little use, $695; Icom IC25-A VHF txvr, GC, $250 ono. VK2KHF Don. Ph: (068) 48 3575.

● WERNER WULF 3el 20m beam and Kenpro 2000RC rotator, both in VGC. Will accept any reas offer. David VK2BZM. (02) 498 2259.

● ESTATE VK2IS TS93OS, VGC with service manual, $1900; Shinwa LPF, $40; Daiwa CNG20, SWR meter, $75; DigiMax frequency counter, $120; Advance signal generator 7.5-250MHz, $100; Philips CRO, $75; Micronta DMM, $75; DL6WV 70cm long yagi, $130; KenPro KR400 rotator, $250; EA digital frequency counter U/S, $50. DSE Explorer 2m unfinished, $75; VPS home brew, $40; assorted CO-AX RG8RG58, $50; hundreds valves, $100; hundreds EA AR, $50; various old test gear and parts. Robert Brinkman QTHR VK2IS. (066) 52 3376.

● OSCILLOSCOPE Telequipment D43R dual-beam 25MHz, rack mount, with A, C2 and G plug-ins, plus manuals, VGC, $300 ono. Tektronix plug-ins, type B, CA and LA, from $75. VK2KLH QTHR Brian. (02) 545 2650.

● ALINCO DR-590T 2m 70cm FM mobile 45w/35w full-duplex DTMF mic dual receive, the lot still under warranty, manual, $750. Steve VK2ASG. (02) 565 9730 (BH) or (043) 24 1542 (AH).

● BRAND NEW Sangean World Range Receiver. Full freq range 150K to 29999K and Fm 87 to 108M. tuning direct entry ditigal manual scan with memory storage. Tunable BFO. Clock for auto operation. Morse keys, Bendix and one ex-disposals ex-army type. Alfred VK2AXR. (02) 477 6275 QTHR.

● YAESU FT-736 VHF/UHF with factory fitted 6m, 2m & 70cm modules, also includes MD-1 desk mike and two TOKYO HY-power linear amps, one for 2m HL-62v, 60w) and 6m (HL-66V, 60w) still in boxes, bought at Gosford one month ago with two-year warranty and receipts, $2950. No shipping. Bert VK2BTW, PO Box 573, Bowral 2576. Serial No 9G290504. Ph (048) 61 2092.

● YAESU FT4700RH dual band 70cm/2m transceiver. Ideal for car or base station. All extras included, 5 and 50w output, detachable front panel, 20 memories per band, ARS, CTCSS, tone encode/decode, full duplex crossband, extended frequency response 140-174MHz, DTMF microphone autodialler (ideal for phone patch). Almost new. Great buy at $890. YAESU FT470 mobile dual band 70cm/2m transceiver, 21 memories, CTCSS tones encode/decode, DTMF autodialler, full duplex crossband operation, ARS, scanning and priority monitoring, extra battery. Almost new. Great unit at $695. VK2XTQ QTHR. (02) 690 9435.

● KW2000E 1.8-30MHz, GC, RF speech proc $250. 72CH 10mx T/R Courier GC, $200 ono. Frequency counter $110. R1155, EC. WW2 $100. System 80 computer monitor, plenty games, $50. Hi and Lo band AWA-FM car phones. Offer. VK2AJY. (043) 96 4553.

● VIKING 352D CB converted to 10m 24 channel USB LSB AM plus 5kHz per channel TRX clarify $100. Vintage Cossor CRO 1066, Mk3 distorted raster, $75. Delivered Melbourne. (050) 30 2464 or Box 89, Koraleigh 2735. Max VK2CMS.

FOR SALE – VIC

● DECEASED ESTATE VK3DKO. Offers are invited for the following equipment. Much of the equipment is as new and in original packing. Kenwood TR751A 144MHz all mode transceiver; Kenwood PS430 DC power supply; Kenwood AT250 antenna tuner; Daiwa LA2155 144MHz linear amplifier; Yaesu FC757-AT full automatic antenna tuner; Yaesu FT-757GX transceiver; Kenwood TS-430S transceiver; MFT MFJ-989C antenna tuner 3kW series, roller inductor; Yaesu FL2100Z linear amplifier; Yaesu FL2100 linear amplifier; Heathkit SB610 monitor scope; Kenwood TM-221A 144MHz transceiver; 1 pair 572B valves; 20amp DC supply; Kenwood SP430 speaker; ATN 13-30-9 log periodic antenna in original carton (new — never used); Create rotator RC5A (with bearing and stainless steel hardware) (new — never used); Archer automatic servo rotor, cat no 15-1220 c/w cable; Kenpro antenna rotor KR-250 C/W cable; Daiwa CN550 dual needle SWR meter. Contact Les Burr (03) 417 7566 or Box 1548 Collingwood , Vic 3066.

● COLLINS power supply 426U-2, 90 to 140 vac, 45 to 450 Hz, 1PH to 3PH or DC, to 27.5V DC 100A. Circuit. Macchi inverter 28VDC to 115/200 VAC 400Hz, 3PH/1PH, 750/750VA. $200. David VK3BFB. (03) 587 1593.

● COMMODORE 128 s/n 4498776. 5¼ floppy disk drive, s/n 1003710. MPS 1250 printer s/n XU5001170 W/speed accelerator cartridge.Fax, RTTY & CW listening kit RS232 in/out. 70 disks, games, office, ham radio, plus all manuals and guide for programmers, $900. (054) 60 4048.

● YAESU YM48 mic with tone encoder and scan, $65; Yaesu 50-54MHz module for FT726R, $325. Palomar FL4 audio filter, $45. Roger VK3XRS. (051) 56 8291.

● KENWOOD TS820S with external VFO MC50 microphone, Seiko SC7000 scanner, EC, still in box. UHF handheld Nicad battery and charger. (051) 99 2811.

● VALVES 6146, $12; 6146B, $12; QQ EO3/12 $8; 2C39BA, $18; 33 $12; 5763 $5; 6BLB, 6AU6, 6C4, 6ES8, 6U9, $4 ea. Diecast box 185 x 120 x 80, $25. Some butterfly capacitors. Roger VK3XRS. (051) 56 8291.

● TELEREADER CWR 685E CW RTTY Baudot ASKII Built-in green phosphor 5-inch CRT Amptor, converter, keyboard 4amp 13.8V power supply. All instructions, $650. S/N 521109. (051) 57 0236.

● TENTEC DELTA 580 HF Txvr 100 watts output EC with desk mic and manuals, $695. Rob VK3JE. (03) 584 4737 or (060) 37 1262 (free freight).

● LINEAR AMP 100w on six DSE kit assembled, VGC, $250. Five-element delta loop for 6m on 4.5m boom. Offers? VK3FMD Martin. (03) 580 6500 (w), (03) 583 7062 (h).

● MAST H/duty, 6' galv sections ex-Army 16 @ $25. Will haggle for lot. Fairchild Portascope 20MHz dual trace CRO with manual, $150. Barrie VK3KAY QTHR. (058) 21 5756.

● NALLY TOWER 17m, free standing, wind up, tilt over, no rust C/W Hygain TH€-DXX beam and Emotator 502CXX heavy duty rotator, all PC. Replacement cost $2800, sell $1500. Ken VK3MW. (03) 560 5278. QTHR.

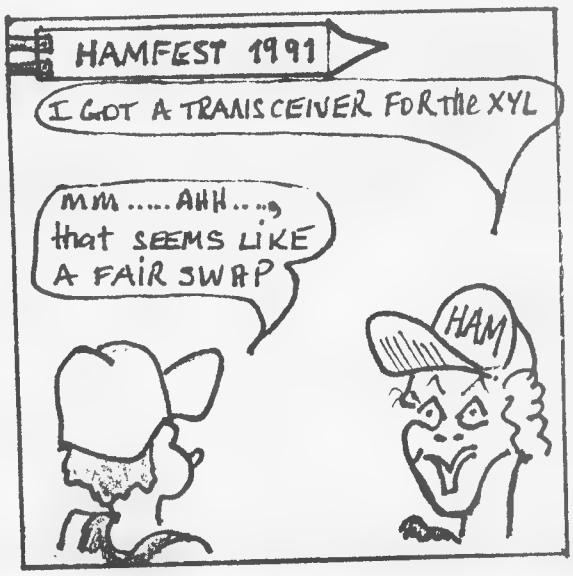
● BARGAIN PRICES for new and used parts. Panel meters, MR2P 0-50UA, 0-50MA, 0-250MA etc, $10 ea. 3 gang variable 450uuf sec $13 ea. Primo PTT dyamic HH mics, $10. 250/110v trans 2.17 amp, $17.50. TX valves 2 x 813, 2 x 828, 2 x 837, 2 x 6146, 2 x 832, 4E27, 815, 829B and 807s, new & used. Offers. Many sockets avail to suit RX valves $2 & $3 ea. Octal, Noval Bases. Let me know your needs. Split stator & assor Tx & Rx variable caps. From $2. Don VK3ADI. (03) 882 0020 BH, (03) 859 5593 AH.

● MALDOL HS-260 twin meter SWR and power meter measurable power 0-12W 0-120W frequency 3.5-150MHz. Chris QTHR VK3CXP. (03) 328 4849 BH, AH 366 5060. $80 ono.

● BATTERIES 12 2v 200amp hour Chloride lead acid cells, $50 ea or 6 for $2. 4 x 6volt 90amp hour, Chloride lead acid cells, $100 each or 2 for $160. 4 x 12 volt, 50amp hour Powersonic gell cells, $120 ea or 2 for $200 2 x 12volt 40amp hour Powersonic gell cell, $110. Evan VK3EJV. (03) 438 2878.

FOR SALE - QLD

● ICOM 750 (751) TXCVR $1350 ono, mint cond. Yaesu FL2100B linear fine tuned $750. VK4LC QTHR. (075) 45 2144.



Adrian Fell VK2DZF

● VALVES 572B T160L new, unused, suit linear amp, $350 the pair. Peter VK4APD QTHR. (07) 397 3751 AH.

● TEST equipment — new valves for vintage radios, also other types including transmitting. Limited quantity. Send SAE for list of your requirements. VK4DY QTHR.

● PARTS ex 10kW TV TX 6166 valves, 1ph 240V AC 25A V Reg. 3ph 19a 415V AC V reg. Large Cs 1/7500V, 2/5000V, 4/1500V, 8/1500V. Large 3ph power TFXs 2260v, 57A, 615V, 2.2 KVA, 8.4V 150A, 6KV, 22KVA. Lots more. VK4BJ. (07) 378 4483.

● PATON valve multi-tester old, what offers? Yaesu FT7 txcv $400. Don VK4NWW. (07) 888 4052 QTHR.

● TRIBAND HF beam antenna with BN86 balun, VGO $250 ono. QTHR VK4GB. (070 396 1836.

FOR SALE - STH AUST

● FT101ZD WARC bands SN 240632 spare 6146s hand desk mics FL2100Z SN 160061, both top order. Sell as pair. $1750 ono. Murray VK5BVJ. (087) 38 0000 QTHR.

FOR SALE – TAS

● KENWOOD TM231A 2m FM mobile 50w high 10w low receives 136-173MHz. As new, $500. Kenwood DRV1 digital recording unit, new, $165, suits TM231A 731A 431A 241A boxes, manuals etc. Yaesu FT707 service manual. $25 (003) 27 2332 VK7AN QTHR.

FOR SALE WA

● QUAD BEAM HF antenna made by Hi-Gain USA. Single 50 Ohm feed two element 3 band SWR 1/1.2 on 40ft tower winding down 20ft. $200 ono. Moving QTHR Tom Long. (09) 386 7692.

● BRAND NEW Complete unused full copy of Supercak 5. This is an unwanted prize but a powerful spreadsheet package for the IBM PCs. Of no use to me due to wrong sort of computer. Will swap for something or $300 ono. QTHR VK6FKB. (09) 581 6303.

● FTI TRANSCEIVER $1500 FT726R TX fitted 2m 70cm plus satellite modles, $1200. 2-813 valves, $30 ea. 3-813 bases, $10 ea. 2-12v 100va power supplies stabilised, $60 ea. 1 microwave modules converter, $70. All mint. VK6TP QTHR. (09) 299 6741.

WANTED NSW

● MINI BEAM 20m or tribander to suit pair 3-500Z VK2AX. (02) 969 6570, PO Box 489, Spit Junction 2688.

● AUSTRALIAN Official Radio Service Manuals, vols 1, 2, 4 (1937-1941) published by The Strand Press Pty Ltd. Also need circuit details or any information re Wagner Model A531 broadcast and shortwave receiver. VK2VJD John QTHR. (047) 51 3066.

● YAESU FT101ZD MKIII prefer CW filter must be in GC. (02) 899 1553 or write PO Box 344 Baulkham Hills 2153. Adrian VK2DZF.

● HISTORIC Reconstruction Project lifetime ambition. Require PRE1930 Xmitting bottle, Eg UV202 UV203 UV204 UX210. Mullard 0/20 0/30 0/40 etc. Any interesting item for project welcome. Please ring reverse charges for a chat. Dave Bird QTHR. (02) 450 2611 AH VK2TNX.

● NON-INDUCTIVE resistors, 30w plus. 25, 35, 50, 75 Ohm or thereabouts. VAC relay. Ron. (02) 918 3835.

● 70cm RX IC402, IC215, working or not, buy or exchange. VK2AJY. (043) 96 4553.

● AZIMUTH rotator indicator, made by Iwasaki Inco Ltd or circuit diag of same. (02) 416 1381.

● URGENTLY. Photocopy of the circuit diagram KYOKUTO FM144-10SXRII 2m FM transceiver. Please help. Greg Neuwenhuis VK2YBD, PO Box 101 Douglas Park 2569.

WANTED – VIC

● COPY OF operating manual or similar information for Q-Craft power/SWR meter model SWR-2. All costs reimbursed. Roy VK3XY QTHR. (03) 557 1265.

● MOBILE HF txcvr, small size FT7 FT730 or similar. Stewart VK3NV QTHR. (059) 873592.

● YAESU YO901 monitor scope for FT901 series txcvr. Also 2m convertor. VK3APA QTHR. (058) 64 6287.

● AWA TYPE "D" plug-in crystals for car phones Rx=(Sig freq (Mhz)–2)/14. Transmit Xtal = 36 times crystal frequency. 30 pF cap sets required for Victorian 2m voice repeaters. Vincent VK3AJO. (03) 872 3503, (03) 657 3385 B/H.

● COLLINS KWM2 or KWM2A xcvr in EC. Rob VK3JE. (03) 584 5737.

● ELECTRICAL & TELEPHONE equipment, cable, tools, hardware and access C64 computer, drills, electrical testers, batteries and heaps of good bargains. Approx $12,000 worth of goods must be sold. For inventory copy please phone Evan VK3EJV. (03) 438 2878 AH.

WANTED QLD

● COPY instruction manual Tono 7000 (not 7000E) any other data. Pay all costs. Bob VK4FPO QTHR. (079) 27 1442.

● REQUIRE 7700kHz crystal, Aldis Lamp bulbs 12v 36w and any information on WWII Aldis signalling lamp, USA army hand generator GN45B 6/500 volts, navy B41 receiver. VK4EF. 97 Jubilee Tce, Bardon 4065. (07) 366 1803.

● TH328 TH308 YD1333 and 7650 YL1110 transmitter tubes. VK4TL John. (070) 54 3677.

● YAESU FRG 7700 or Kenwood R1000 in good working condition. (074) 47 1357.

WANTED – STH AUST

● BASE CONNECTION and electrical data for Philips DG7-5 and DG7-31 cathode ray tubes. Information re oscilloscope textbooks welcome. K-Postler VK5KI QTHR. (08) 264 1902.

WANTED WA

● 70cm or 23cm HT or mobile. Homebrew equip OK. Also 2m or 70cm Yagis and ATV equip, homebrew OK. VK6KDS Dave QTHR.

● INTRUDER WATCH observer in VK6. Free tape, logs, postage and advice. Please help. Contact Graham VK6RO QTHR. (09) 451 3561.

HAMADS

Please Note: If you are advertising items For Sale and Wanted please use a separate form for each. Include all details; eg Name, Address, Telephone Number (and STD code), on both forms. Please print copy for your Hamad as clearly as possible.
*Eight lines per issue free to all WIA members, ninth line for name and address Commercial rates apply for non—members. Please enclose a mailing label from this magazine with your Hamad.
*Deceased Estates: The full Hamad will appear in AR, even if the ad is not fully radio equipment.
*Copy typed or in block letters to PO Box 300,
Caulfield South, Vic 3162, by the deadline as indicated on page 1 of each issue.
*QTHR means address is correct as set out in the WIA current Call Book.

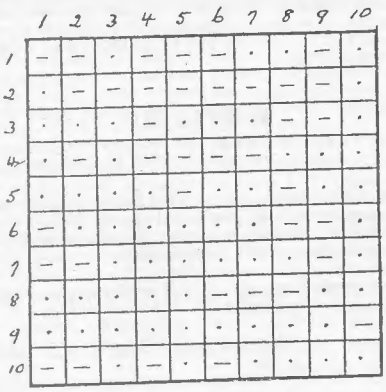
*WIA policy recommends that Hamads include the serial number of all equipment offered for sale.
*Please enclose a self addressed stamped envelope if an acknowledgement is required that the Hamad has been received.
Ordinary Hamads submitted from members who are deemed to be in general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re—sold for merchandising purposes.
Conditions for commercial advertising are as follows: $25.00 for four lines, plus $2.25 per line (or part thereof) Minimum charge — $25.00 pre—payable.

State: .....

Not for publication: ❑ Miscellaneous ❑ For Sale ❑ Wanted

Name: ..... Call Sign: ..... Address: .....

Solution to Morseword No 50



Across: 1 matter; 2 jog; 3 steep; 4 rob; 5 safe; 6 beep; 7 give; 8 suttee; 9 sheet; 10 Mars.

Down: 1 Bega; 2 quit; 3 lies; 4 onset; 5 manse; 6 mask; 7 ended; 8 wand; 9 outs; 10 Essen

TRADE PRACTICES ACT

It is impossible for us to ensure the advertisements submitted for publication comply with the Trade Practices Act 1974. Therefore advertisers and advertising agents will appreciate the absolute need for themselves to ensure that, the provisions of the Act are complied with **strictly.**

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All advertisers are advised that advertisements containing only a PO Box number as the address cannot be accepted without the addition of the business address of the boxholder or seller of the goods.

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ADVERTISERS INDEX

Amateur Radio Action 14
ATN Antennas 51
Dick Smith Electronics 26-29
Electronics World 6
Emtronics 18
Firemoon 5
ICOM ..... OBC
Kenwood ..... IFC
Prentice Hall 7
Wia Bookshops ..... IBC
WIA NSW Division 45

TRADE ADS

M Delahunty 54
M Griffith 54
RJ & US Imports 54

HOW TO JOIN THE WIA

Fill out the following form and send to:

The Membership Secretary
Wireless Institute of Australia
PO Box 300
Caulfield South, Vic 3162

I wish to obtain further information about the WIA.

Mr, Mrs, Miss, Ms: .....

.....

Call Sign (if applicable): .....

Address: .....

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State and Postcode: .....

VK QSL Bureaux

The official list of QSL Bureaux. All are Inwards and Outwards unless otherwise stated.

VK1	GPO Box 600 Canberra ACT 2601
VK2	PO Box 73, Teralba NSW 2284
VK3	Inwards – GPO Box 757G Melbourne Vic 3001
	Outwards _ 38 Taylor St Ashburton Vic 3147
VK4	GPO Box 638 Brisbane Qld 4001
VK5	PO Box 10092 Gouger St Adelaide SA 5000
Vk6	GPO Box F319 Perth WA 6001
VK7	GPO Box 371D Hobart Tas 7001
Vk8	C/o H G Anderson VK8HA
	Box 619 Humpty Doo NT 0836
VK9/Vk0	C/o Neil Penfold VK6NE
	2 Moss Court Kingsley WA 6026

WIA Divisional Bookshops

The following items are available from your Division's Bookshop
(see the WIA Division Directory on page 3 for the address of your Division

	Ref	Price to Members
ANTENNA BOOKS		
Ant. Compendium Vol 2 Software only	BX293	$18.00
Antenna Compendium Vol 1 ARRL	BX163	$19.80
Antenna Compendium Vol 2 & Software ARRL	BX294	$32.40
Antenna Compendium Vol 2 ARRL	BX292	$21.60
Antenna Handbook - Orr	BX217	$15.57
Antenna Impedance Matching - ARRL	BX257	$27.00
Antenna Note Book W1FB - ARRL	BX179	$18.00
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Beam Antenna Handbook - New ED. 1990 Orr	BX215	$17.37
Cubical Quad Antennas - Orr	BX214	$13.05
HF Antennas - Moxon RSGB	BX188	$27.00
Novice Antenna Notebook DeMaw - ARRL	BX162	$14.40
Practical Wire Antennas - RSGB	BX296	$25.20
Reflections - Software 5 in disk	BX358	$18.00
Reflections - Transmission lines The Book - ARRL	BX348	$36.00
Smith Chart Expanded Scale PK of 10	BX903	$5.94
Smith Charts Stand Scale SET Co-or. PK of 10	BX900	$5.94
The Antenna Handbook - ARRL	BX161	$32.40
The Truth About CB Antennas - Orr	BX219	$15.57
Transmission Line Transformers - ARRL	BX329	$36.00
Vertical Antenna Handbook - Lee	BX284	$16.65
Vertical Antennas - Orr	BX220	$14.27
Yagi Antenna Design - ARRL	BX164	$27.00
ATV BOOKS		
Micro and Television Projects - BATC	BX272	$9.45
The ATV Compendium - BATC	BX270	$15.75
The Best Of CQ-TV - BATC	BX273	$15.75
The Slow Scan Companion - BATC	BX274	$11.70
TV For Amateurs - BATC	BX271	$8.32
CALL BOOKS		
Radio Call Book International 1991	BX339	$56.25
Radio Call Book North America 1991	BX338	$52.65
Radio Call Book Supplements 1991 Due June	BX364	$15.75
FICTION		
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CQ Ghost Ship - ARRL	BX204	$9.45
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HANDBOOKS		
1991 ARRL Handbook	BX337	$47.61
Electronics Data Book - ARRL	BX201	$21.60
Motorola RF Device Data - 2 Volumes	BX47	$22.05
Operating Manual - ARRL	BX192	$27.00
Operating Manual - RSGB	BX359	$25.20
Radio Communication Handbook - RSGB	BX266	$50.40
Radio Data Reference Book - RSGB	BX189	$32.40
Radio Handbook 23rd edition - Bill Orr	BX224	$53.91
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HISTORY		
200 Meters and Down 1936 - ARRL	BX198	$7.20
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Golden Classics of Yesterday - Ingram	MFJ30	$18.45
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	Ref	Price to Members
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Morse Code Tapes Set 3: 15-22 WPM - ARRL	BX333	$16.65
Morse Code Tapes Set 4: 13-14 WPM - ARRL	BX334	$16.65
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Low Band DXing - John Devoldere	BX195	$18.00
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Computer Networking Con (Packet) No 5 1986 - ARRL	BX167	$18.00
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Computer Networking Con (Packet) No 9 1990 - ARRL	BX360	$21.60
Computer Networking Conf (Packet) 1-4 1982/5	BX166	$32.40
Gateway to Packet Radio 2nd edition - ARRL	BX169	$21.60
Packet Radio Made Easy - Rogers	MFJ32	$18.45
Packet Users Notebook - Rogers	BX285	$16.65
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Satellite AMSAT-NA 5th Symposium 1987 - ARRL	BX182	$15.75
Satellite AMSAT-NA 6th Symposium - ARRL	BX199	$15.75
Satellite Anthology - ARRL	BX180	$14.40
Satellite Experimenters Handbook 1990 edition	BX177	$36.00
Weather Satellite Handbook - ARRL	BX324	$36.00
Weather Satellite Handbook Software only - ARRL	BX326	$18.00
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Microwave Update Con. 1988 - ARRL	BX183	$15.75
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